Practice Exam 1: Wine Composition and Faults

1. Which compound is responsible for the musty, wet cardboard aroma commonly associated with cork taint?

A. Acetaldehyde

B. 2,4,6-Trichloroanisole (TCA)

C. Hydrogen sulfide

D. Brettanomyces

2. At approximately what percentage does alcohol typically fall in dry table wines?

A. 5.5% to 8%

B. 8.5% to 15%

C. 16% to 18%

D. 19% to 22%

3. What is the primary component of wine by volume?

A. Alcohol

B. Glycerol

C. Water

D. Acids

4. Which acid is the most prevalent organic acid found naturally in grapes?

A. Malic acid

B. Citric acid

C. Lactic acid

D. Tartaric acid

5. What wine fault is characterized by aromas of barnyard, band-aid, or medicinal notes?

A. Oxidation

B. Reduction

C. Brettanomyces

D. Volatile acidity

6. Which compound contributes to the perception of body and sweetness in dry wines without adding sugar?

A. Tannin

B. Glycerol

C. Anthocyanin

D. Sulfur dioxide

7. What is the typical pH range for most table wines?

A. 1.5 to 2.5

B. 2.8 to 3.8

C. 4.5 to 5.5

D. 6.0 to 7.0

8. Which type of tannin is derived from grape skins, seeds, and stems?

A. Hydrolyzable tannins

B. Ellagitannins

C. Condensed tannins

D. Gallotannins

9. What fault produces aromas reminiscent of vinegar or nail polish remover?

A. Reduction

B. Cork taint

C. Heat damage

D. Volatile acidity

10. Which compound is primarily responsible for red wine color?

A. Flavonols

B. Anthocyanins

C. Catechins

D. Resveratrol

11. What happens to malic acid during malolactic fermentation?

A. It is converted to tartaric acid

B. It is converted to citric acid

C. It is converted to lactic acid

D. It is converted to acetic acid

12. Which gas is associated with reductive wine faults producing rotten egg aromas?

A. Carbon dioxide

B. Sulfur dioxide

C. Hydrogen sulfide

D. Nitrogen

13. What is the term for the crystalline deposits sometimes found in wine bottles?

A. Lees

B. Tartrates

C. Phenolics

D. Colloids

14. Which compound acts as an antioxidant and antimicrobial agent in winemaking?

A. Glycerol

B. Ethanol

C. Sulfur dioxide

D. Carbon dioxide

15. What causes the "legs" or "tears" that form on the inside of a wine glass?

A. Sugar content only

B. Acid concentration

C. Tannin levels

D. Alcohol and glycerol content

16. Which acid is produced as a byproduct of alcoholic fermentation?

A. Tartaric acid

B. Succinic acid

C. Malic acid

D. Citric acid

17. What wine fault results from excessive exposure to oxygen?

A. Reduction

B. Oxidation

C. Mercaptans

D. Cork taint

18. Which compound class is responsible for the astringent, drying sensation in red wines?

A. Organic acids

B. Sugars

C. Tannins

D. Esters

19. At what concentration level can TCA typically be detected by most people?

A. Parts per hundred

B. Parts per thousand

C. Parts per million

D. Parts per trillion

20. What is the primary sugar found in grapes?

A. Sucrose

B. Maltose

C. Lactose

D. Glucose and fructose

21. Which winemaking problem is indicated by a wine that appears prematurely brown?

A. Reduction

B. Volatile acidity

C. Oxidation

D. Brettanomyces

22. What compound is responsible for the buttery aroma in some wines?

A. Acetaldehyde

B. Diacetyl

C. Ethyl acetate

D. Methoxypyrazine

23. Which type of phenolic compound contributes to color stability in red wines through copigmentation?

A. Tannins

B. Flavonols

C. Anthocyanins

D. Stilbenes

24. What is the effect of higher acidity on a wine's pH?

A. Higher pH

B. Lower pH

C. No effect on pH

D. Variable effect depending on sugar

25. Which fault is often described as smelling like burnt matches or rubber?

A. Oxidation

B. Cork taint

C. Reduction

D. Heat damage

26. What percentage of wine is typically composed of compounds other than water and alcohol?

A. Less than 2%

B. 5% to 10%

C. 15% to 20%

D. 25% to 30%

27. Which compound is associated with green bell pepper aromas in wines?

A. Diacetyl

B. Methoxypyrazine

C. Rotundone

D. Linalool

28. What is the term for the haze that can develop in white wines due to unstable proteins?

A. Tartrate instability

B. Protein haze

C. Microbial spoilage

D. Oxidative browning

29. Which acid decreases significantly during the ripening process of grapes?

A. Tartaric acid

B. Lactic acid

C. Malic acid

D. Citric acid

30. What fault occurs when wine is exposed to excessive heat during storage or transport?

A. Reduction

B. Lightstrike

C. Maderization

D. Cork taint

31. Which compound contributes to the peppery character found in some Syrah wines?

A. Linalool

B. Geraniol

C. Rotundone

D. Terpineol

32. What is the primary role of anthocyanins in wine?

A. Providing tannin structure

B. Contributing color pigmentation

C. Adding aromatic complexity

D. Increasing acidity

33. Which wine component increases during the fermentation process?

A. Malic acid

B. Sugar

C. Alcohol

D. Tartaric acid

34. What causes the petrol or kerosene aroma that develops in aged Riesling?

A. Brettanomyces

B. TDN (trimethyl-dihydronaphthalene)

C. Hydrogen sulfide

D. Acetaldehyde

35. Which type of acid is added to wines in warm climate regions to increase acidity?

A. Lactic acid

B. Acetic acid

C. Tartaric acid

D. Succinic acid

36. What is the maximum legal limit for volatile acidity in most table wines?

A. 0.1 g/L

B. 0.5 g/L

C. 1.2 g/L

D. 2.5 g/L

37. Which compound is responsible for the floral aromas in Muscat varieties?

A. Methoxypyrazine

B. Rotundone

C. Linalool

D. Diacetyl

38. What causes lightstrike in wine?

A. Excessive heat exposure

B. Oxygen exposure

C. Ultraviolet light exposure

D. Bacterial contamination

39. Which phenolic compound has been associated with potential health benefits in red wine?

A. Catechin

B. Quercetin

C. Resveratrol

D. Gallic acid

40. What is the term for the process where tannins polymerize and precipitate over time?

A. Oxidation

B. Esterification

C. Polymerization

D. Hydrolysis

41. Which volatile compound at low levels contributes complexity but at high levels creates a vinegar fault?

A. Ethyl acetate

B. Hydrogen sulfide

C. Sulfur dioxide

D. Diacetyl

42. What component of wine provides the primary preservative effect against microbial spoilage?

A. Tannins

B. Alcohol

C. Acids

D. All of the above working together

43. Which compound causes the sherry-like or bruised apple aroma in oxidized white wines?

A. Diacetyl

B. Hydrogen sulfide

C. Acetaldehyde

D. Ethyl acetate

44. What is the typical residual sugar level in a wine labeled as "dry"?

A. Less than 4 g/L

B. 10-20 g/L

C. 25-50 g/L

D. Over 50 g/L

45. Which acid is the primary component of volatile acidity?

A. Tartaric acid

B. Malic acid

C. Acetic acid

D. Lactic acid

46. What wine fault may dissipate with aeration or decanting?

A. Cork taint

B. Volatile acidity

C. Mild reduction

D. Heat damage

47. Which compound class includes the tannins derived from oak barrels?

A. Condensed tannins

B. Hydrolyzable tannins

C. Proanthocyanidins

D. Catechins

48. What causes the formation of sediment in aged red wines?

A. Bacterial growth

B. Protein instability

C. Tannin and pigment polymerization

D. Tartrate crystallization only

49. Which factor most directly influences the perception of sweetness in wine?

A. Color intensity

B. Alcohol level

C. Balance with acidity

D. Tannin concentration

50. What is the primary cause of hazes in wines that have not been properly cold stabilized?

A. Protein precipitation

B. Tartrate crystal formation

C. Microbial growth

D. Oxidation products

51. Which compound is responsible for the cat urine or boxwood aroma sometimes found in Sauvignon Blanc?

A. Linalool

B. 4-MMP (4-mercapto-4-methylpentan-2-one)

C. Rotundone

D. TDN

52. What happens to wine color as red wines age?

A. Color becomes more purple

B. Color shifts from ruby to garnet to tawny

C. Color becomes more opaque

D. Color remains unchanged

53. Which microorganism is responsible for converting malic acid to lactic acid?

A. Saccharomyces cerevisiae

B. Brettanomyces bruxellensis

C. Oenococcus oeni

D. Acetobacter aceti

54. What is the effect of tannin polymerization on wine texture?

A. Increased astringency

B. Softening of tannins

C. Increased bitterness

D. No perceptible change

55. Which compound contributes to the rose petal aroma in some wines?

A. Linalool

B. Geraniol

C. Rotundone

D. Methoxypyrazine

56. What is the term for wines that have absorbed unwanted aromas from their environment?

A. Oxidized

B. Reduced

C. Tainted

D. Maderized

57. Which grape component contributes most to the potential alcohol level of finished wine?

A. Acids

B. Sugars

C. Phenolics

D. Water content

58. What causes the sparkling appearance of carbonation in wine?

A. Oxygen dissolution

B. Carbon dioxide dissolution

C. Nitrogen dissolution

D. Sulfur dioxide dissolution

59. Which compound at excessive levels produces aromas of geraniums in wine?

A. Sorbic acid breakdown products

B. Hydrogen sulfide

C. Acetaldehyde

D. Diacetyl

60. What is the relationship between pH and titratable acidity?

A. They always move in the same direction

B. They always move in opposite directions

C. They measure different aspects of acidity

D. They are identical measurements

61. Which wine fault is characterized by a mousy or wet animal smell?

A. Cork taint

B. Brettanomyces

C. Volatile acidity

D. Oxidation

62. What is the effect of cold stabilization on wine?

A. Removes excess tannins

B. Precipitates tartrate crystals

C. Eliminates protein haze

D. Reduces alcohol content

63. Which compound is responsible for the eucalyptus or menthol aromas in some wines?

A. Linalool

B. 1,8-Cineole

C. Rotundone

D. Geraniol

64. What factor primarily determines the color intensity of red wines?

A. Alcohol level

B. Acidity

C. Extraction and grape variety

D. Residual sugar

65. Which microorganism causes acetic acid production in wine?

A. Saccharomyces cerevisiae

B. Oenococcus oeni

C. Brettanomyces

D. Acetobacter

66. What is the term for the browning that occurs in white wines due to phenolic oxidation?

A. Maderization

B. Browning

C. Pinking

D. Reduction

67. Which compound provides the backbone structure for anthocyanin color compounds?

A. Flavonol

B. Flavan-3-ol

C. Flavylium cation

D. Stilbene

68. What is the primary sensory effect of excessive sulfur dioxide in wine?

A. Bitter taste

B. Burning or pungent aroma

C. Metallic taste

D. Astringent texture

69. Which type of sugar remains in wine when fermentation stops before completion?

A. Sucrose

B. Maltose

C. Residual sugar

D. Dextrose

70. What causes wine to develop a spritz or slight effervescence when not intended?

A. Secondary fermentation in bottle

B. Excessive sulfur dioxide

C. Oxidation

D. Protein instability

71. Which compound contributes to the honey-like aromas that develop in aged sweet wines?

A. Sotolon

B. Diacetyl

C. Linalool

D. Rotundone

72. What is the effect of higher alcohol on the body of wine?

A. Lighter body

B. Fuller body

C. No effect on body

D. Reduced viscosity

73. Which acid is sometimes used for deacidification in cool climate wines?

A. Tartaric acid

B. Calcium carbonate

C. Citric acid

D. Malic acid

74. What compound is responsible for the herbaceous character in some Cabernet Sauvignon wines?

A. Rotundone

B. Linalool

C. Methoxypyrazine

D. Geraniol

75. Which factor most significantly affects the extraction of phenolic compounds during red winemaking?

A. Yeast strain

B. Fermentation temperature and duration

C. Sugar content

D. Acid additions

76. What is the term for the science of wine composition and winemaking?

A. Viticulture

B. Enology

C. Ampelography

D. Sommellerie

77. Which compound contributes to the smoky or toasty aromas in oak-aged wines?

A. Vanillin

B. Guaiacol

C. Linalool

D. Rotundone

78. What happens to the color of white wines as they age?

A. Become paler

B. Become darker and more golden

C. Develop purple hues

D. Remain unchanged

79. Which type of phenolic compound is primarily responsible for bitterness rather than astringency?

A. Tannins

B. Anthocyanins

C. Flavonols

D. Monomeric phenols

80. What is the primary cause of protein instability in white wines?

A. Excessive tannins

B. Heat-unstable grape proteins

C. High sugar content

D. Low acidity

81. Which compound gives oak-aged wines their characteristic vanilla aroma?

A. Guaiacol

B. Furfural

C. Vanillin

D. Eugenol

82. What is the effect of malolactic fermentation on wine acidity?

A. Increases total acidity

B. Decreases total acidity

C. Has no effect on acidity

D. Increases only volatile acidity

83. Which microorganism is primarily responsible for alcoholic fermentation in wine?

A. Lactobacillus

B. Oenococcus oeni

C. Saccharomyces cerevisiae

D. Acetobacter

84. What causes the greenish tinge sometimes visible in young white wines?

A. Chlorophyll

B. Low pH

C. Anthocyanins

D. Copper contamination

85. Which compound at fault levels produces aromas of cabbage or cooked vegetables?

A. Hydrogen sulfide

B. Dimethyl sulfide

C. Mercaptans

D. Ethyl acetate

86. What is the approximate caloric content of alcohol per gram?

A. 4 calories

B. 7 calories

C. 9 calories

D. 12 calories

87. Which factor most influences the development of tertiary aromas in wine?

A. Grape variety

B. Fermentation temperature

C. Bottle aging

D. Oak contact

88. What compound is formed when hydrogen sulfide reacts with wine components and creates more persistent off-aromas?

A. Sulfur dioxide

B. Mercaptans

C. Acetaldehyde

D. Ethyl acetate

89. Which characteristic distinguishes free sulfur dioxide from bound sulfur dioxide?

A. Free SO2 provides antimicrobial protection

B. Bound SO2 provides antimicrobial protection

C. They are functionally identical

D. Free SO2 only affects color

90. What is the term for the process of deliberately exposing wine to oxygen?

A. Reduction

B. Maceration

C. Oxidative handling

D. Stabilization

91. Which phenolic compound class contributes to the potential browning of white wines?

A. Anthocyanins

B. Hydroxycinnamates

C. Stilbenes

D. Flavonols

92. What causes pinking in white wines made from red grape varieties?

A. Residual anthocyanins

B. Copper contamination

C. Bacterial infection

D. Oxidation

93. Which compound contributes to the clove-like aromas in some oak-aged wines?

A. Vanillin

B. Guaiacol

C. Eugenol

D. Furfural

94. What is the primary function of fining agents in winemaking?

A. Adding flavor

B. Increasing alcohol

C. Removing unwanted particles and compounds

D. Adjusting acidity

95. Which volatile compound can contribute positive complexity at low levels but creates nail polish aromas at high levels?

A. Acetaldehyde

B. Hydrogen sulfide

C. Ethyl acetate

D. Diacetyl

96. What is the term for the waxy coating on grape skins that contains wild yeasts?

A. Cuticle

B. Bloom

C. Lenticels

D. Pulp

97. Which component of wine contributes most to its aging potential?

A. Water content

B. Sugar alone

C. Structure (acid, tannin, and concentration)

D. Color intensity

98. What causes volatile acidity to increase in wine exposed to air?

A. Oxidation of alcohol by Acetobacter

B. Malolactic fermentation

C. Tartrate precipitation

D. Protein breakdown

99. Which sensory characteristic is associated with wines high in residual sugar?

A. Bitterness

B. Astringency

C. Sweetness and viscosity

D. Increased acidity perception

100. What is the term for the chemical reaction between acids and alcohols that creates fruity aromatic compounds?

A. Oxidation

B. Polymerization

C. Esterification

D. Hydrolysis

Answer Explanations

1. B. Cork taint identification - TCA (2,4,6-Trichloroanisole) is the compound responsible for cork taint. It produces musty, wet cardboard, and damp basement aromas that suppress fruit character, detectable at concentrations as low as parts per trillion.

2. B. Table wine alcohol range - Dry table wines typically contain 8.5% to 15% alcohol by volume. This range results from complete fermentation of grape sugars, with variation depending on grape ripeness and regional climate conditions.

3. C. Wine composition basics - Water comprises approximately 85% of wine by volume, making it the dominant component. The remaining percentage consists of alcohol, acids, sugars, phenolics, and hundreds of other compounds contributing to wine character.

4. D. Primary grape acid - Tartaric acid is unique to grapes among major fruits and remains the most prevalent acid throughout ripening and winemaking. It provides structure and contributes to wine's aging potential and microbial stability.

5. C. Brettanomyces identification - Brettanomyces is a spoilage yeast producing barnyard, band-aid, medicinal, and sweaty saddle aromas. At low levels some consider it complexity; at high levels it overwhelms fruit character entirely.

6. B. Glycerol function - Glycerol is a byproduct of fermentation contributing to wine's body and mouthfeel. It provides a subtle perception of sweetness and viscosity in dry wines without adding actual sugar content.

7. B. Wine pH range - Most table wines fall between pH 2.8 and 3.8, with white wines typically lower (more acidic) and red wines higher. This range provides microbial stability while maintaining palatable acidity levels.

8. C. Tannin classification - Condensed tannins (proanthocyanidins) derive from grape skins, seeds, and stems. They polymerize during aging, contributing to astringency, color stability, and the potential for extended bottle development.

9. D. Volatile acidity fault - Volatile acidity at excessive levels produces vinegar (acetic acid) and nail polish remover (ethyl acetate) aromas. Small amounts occur naturally, but elevated levels indicate spoilage by Acetobacter bacteria.

10. B. Red wine color compounds - Anthocyanins are pigmented phenolic compounds responsible for red and purple colors in wine. They reside in grape skins and are extracted during maceration, with color stability improved through tannin binding.

11. C. Malolactic conversion - During malolactic fermentation, bacteria convert sharp malic acid (green apple character) to softer lactic acid (dairy

character). This process reduces total acidity and adds textural complexity to wines.

12. C. Reduction compound - Hydrogen sulfide produces rotten egg aromas and indicates reductive winemaking conditions. It forms when yeasts lack nitrogen nutrients or when wines are deprived of oxygen during fermentation or aging.

13. B. Tartrate crystals - Tartrates are crystalline deposits of potassium bitartrate that precipitate when wines are exposed to cold temperatures. Though visually concerning, they are harmless and indicate the wine was not heavily cold-stabilized.

14. C. Sulfur dioxide role - Sulfur dioxide serves as wine's primary preservative, functioning as both antioxidant and antimicrobial agent. It protects against oxidation and inhibits unwanted bacterial and yeast activity throughout winemaking and aging.

15. D. Wine legs explanation - The "legs" or "tears" on glass surfaces result from the Marangoni effect, caused by differential evaporation rates of alcohol and water. Higher alcohol and glycerol content produce more pronounced, slower-moving legs.

16. B. Fermentation byproduct acid - Succinic acid is produced during alcoholic fermentation as a yeast metabolic byproduct. It contributes to wine's overall acid profile and adds a slightly bitter, salty character to the palate.

17. B. Oxidation fault - Oxidation results from excessive oxygen exposure, causing loss of fresh fruit character, browning in whites, and premature aging. Aromas shift toward bruised apple, sherry-like notes, and flatness.

18. C. Astringency source - Tannins cause the drying, puckering sensation in red wines by binding with salivary proteins. This astringency provides structure and grip, softening with age as tannins polymerize.

19. D. TCA detection threshold - TCA can be detected at parts per trillion, making it one of the most potent aroma compounds known. This extremely low threshold explains why even minimal cork contamination renders wines faulty.

20. D. Grape sugars - Glucose and fructose are the primary fermentable sugars in grapes, present in roughly equal proportions at harvest. Yeast converts these simple sugars to alcohol during fermentation.

21. C. Premature browning cause - Premature browning indicates oxidation, where phenolic compounds react with oxygen to form brown pigments. This fault suggests poor storage, damaged closure, or inadequate sulfur dioxide protection.

22. B. Butter aroma compound - Diacetyl produces buttery, butterscotch aromas and is a byproduct of malolactic fermentation. Levels vary based on bacterial strain and winemaking decisions, being desirable in some styles and avoided in others.

23. A. Copigmentation role - Tannins contribute to color stability through copigmentation, binding with anthocyanins to form stable complexes. This interaction prevents color loss during aging and produces the characteristic hue evolution in red wines.

24. B. Acidity and pH relationship - Higher acidity corresponds to lower pH values. The pH scale is logarithmic and inverse, meaning more acidic wines have lower pH numbers, typically ranging from 2.8 to 3.8 for table wines.

25. C. Reduction descriptors - Reduction produces burnt match, rubber, and struck flint aromas from sulfur compounds formed in oxygen-deprived conditions. Mild reduction may dissipate with aeration; severe cases indicate winemaking problems.

26. A. Minor wine components - Compounds other than water and alcohol comprise less than 2% of wine volume. Despite this small proportion, these compounds—acids, phenolics, sugars, and aromatics—determine wine's character and quality.

27. B. Green pepper compound - Methoxypyrazines produce green bell pepper, herbaceous, and vegetal aromas. Associated with Sauvignon Blanc and Cabernet family grapes, these compounds indicate either varietal character or underripe fruit depending on context.

28. B. White wine haze - Protein haze occurs when heat-unstable grape proteins precipitate after bottling. Winemakers prevent this through bentonite fining, which removes proteins before bottling to ensure clarity.

29. C. Ripening acid changes - Malic acid decreases significantly during grape ripening through cellular respiration. This natural reduction contributes to the lower acidity and higher pH found in riper grapes from warmer climates.

30. C. Heat damage term - Maderization describes wine damaged by excessive heat, named for Madeira wines intentionally heated during production. Affected wines show cooked fruit, caramelized aromas, and premature browning.

31. C. Pepper compound in Syrah - Rotundone produces black pepper aromas distinctive to certain Syrah wines, particularly from cooler climates like Northern Rhône. Sensitivity to this compound varies significantly among individuals.

32. B. Anthocyanin function - Anthocyanins provide color pigmentation in red wines, extracted from grape skins during maceration. These compounds determine initial color intensity and, through reactions with tannins, long-term color stability.

33. C. Fermentation products - Alcohol increases during fermentation as yeast converts grape sugars to ethanol and carbon dioxide. The final alcohol level depends on initial sugar concentration and fermentation completion.

34. B. Aged Riesling aroma - TDN (trimethyl-dihydronaphthalene) creates the petrol or kerosene aroma characteristic of aged Riesling. This compound develops from carotenoid precursors during bottle aging, considered typical rather than faulty.

35. C. Acidification practice - Tartaric acid is the preferred addition for acidification because it occurs naturally in grapes and provides stability. Warm climate wines often require acid additions to achieve balanced freshness.

36. C. Volatile acidity limits - Most wine regulations limit volatile acidity to approximately 1.2 g/L for red wines and slightly less for whites. Above these levels, vinegar character becomes objectionable to most consumers.

37. C. Muscat aroma compound - Linalool is the primary terpene responsible for floral aromas in Muscat varieties. This compound contributes rose petal, orange blossom, and perfumed characteristics that define aromatic grape varieties.

38. C. Lightstrike cause - Ultraviolet light exposure causes lightstrike, triggering photochemical reactions that produce sulfur compounds with unpleasant cabbage or wet cardboard aromas. Clear and green bottles offer less protection than brown glass.

39. C. Health-associated compound - Resveratrol, a stilbene phenolic compound concentrated in grape skins, has received attention for potential health benefits. Red wines contain higher levels than whites due to extended skin contact during maceration.

40. C. Tannin evolution term - Polymerization describes the process where tannin molecules bond together, forming larger chains that eventually precipitate as sediment. This reaction softens astringency and contributes to aged wine complexity.

41. A. Ethyl acetate dual role - Ethyl acetate at low levels contributes fruity complexity, but at high levels creates nail polish remover aromas indicating volatile acidity. The compound forms from acetic acid reacting with ethanol.

42. D. Combined preservative effect - Wine preservation results from multiple components working together. Alcohol, acids, tannins, and sulfur dioxide each contribute antimicrobial effects that collectively ensure wine stability.

43. C. Oxidation aroma compound - Acetaldehyde produces sherry-like, bruised apple, and nutty aromas in oxidized wines. This compound forms when ethanol oxidizes and indicates excessive oxygen exposure in table wines.

44. A. Dry wine sugar level - Wines labeled "dry" typically contain less than 4 g/L residual sugar, below most people's perception threshold. At this level, wines taste dry because acidity masks any remaining sweetness.

45. C. Volatile acidity component - Acetic acid is the primary component of volatile acidity,

produced by Acetobacter bacteria oxidizing ethanol. Elevated levels create vinegar aromas that constitute a serious wine fault.

46. C. Aeration-responsive fault - Mild reduction may dissipate with decanting or swirling as oxygen binds with sulfur compounds. This distinguishes reduction from permanent faults like cork taint, which cannot be remedied.

47. B. Oak-derived tannins - Hydrolyzable tannins (ellagitannins and gallotannins) derive from oak barrels rather than grapes. They differ structurally from grape-derived condensed tannins and contribute distinctive toasty, spicy character.

48. C. Sediment formation - Sediment in aged red wines results primarily from tannin and anthocyanin polymerization. These compounds bond together and eventually precipitate, leaving clear wine above harmless deposits.

49. C. Sweetness perception - Acidity balance most directly influences sweetness perception. High acidity can mask considerable residual sugar, while low acidity makes even modest sugar levels taste sweet.

50. B. Cold stability issue - Tartrate crystal formation causes hazes in wines not cold-stabilized. Chilling wine before bottling precipitates these crystals in the winery rather than after purchase.

51. B. Sauvignon Blanc thiol - 4-MMP (4-mercapto-4-methylpentan-2-one) produces cat urine, boxwood, and blackcurrant bud aromas in Sauvignon Blanc. This thiol compound contributes varietal typicity at appropriate levels.

52. B. Red wine color evolution - Red wines progress from purple through ruby to garnet and eventually tawny-brown with age. This evolution reflects anthocyanin degradation and tannin-pigment complex formation over time.

53. C. Malolactic bacteria - Oenococcus oeni is the primary bacterium responsible for malolactic fermentation. This species converts malic acid to lactic acid, softening wine acidity and adding complexity.

54. B. Polymerization effect - Tannin polymerization softens wine texture as individual molecules combine into larger chains. These longer chains feel less astringent on the palate and eventually precipitate as sediment.

55. B. Rose petal compound - Geraniol contributes rose petal and floral aromas to wines, particularly prominent in aromatic varieties like Gewürztraminer. This terpene compound develops in the grape and carries through fermentation.

56. C. Environmental contamination - Tainted wines have absorbed unwanted aromas from their storage environment. Strong odors can penetrate corks over time, compromising wine quality without other visible defects.

57. B. Alcohol potential determinant - Sugar content determines potential alcohol, as yeasts

convert grape sugars to ethanol. Higher sugar concentration at harvest yields higher potential alcohol in the finished wine.

58. B. Carbonation source - Carbon dioxide dissolved in wine creates effervescence. In sparkling wines, this results from secondary fermentation; in still wines, residual CO2 from primary fermentation may produce slight spritz.

59. A. Geranium fault - Sorbic acid breakdown products create geranium-like off-aromas when wines undergo malolactic fermentation after sorbate addition. This fault occurs when this preservative is used inappropriately.

60. C. Acidity measurements - pH and titratable acidity measure different aspects of acidity. pH indicates acid strength (hydrogen ion concentration), while titratable acidity measures total acid content. They often move together but not always.

61. B. Mousy character - Brettanomyces produces mousy, wet animal aromas among its range of off-odors. This spoilage yeast creates various unpleasant compounds that can dominate wine character at elevated levels.

62. B. Cold stabilization purpose - Cold stabilization precipitates tartrate crystals before bottling by chilling wine near freezing. This prevents crystal formation in bottles, which consumers might mistake for glass or contamination.

63. B. Eucalyptus compound - 1,8-Cineole (eucalyptol) produces eucalyptus and menthol aromas, often found in wines from vineyards near eucalyptus trees. The compound transfers to grapes through airborne transmission.

64. C. Color intensity factors - Extraction techniques and grape variety primarily determine red wine color intensity. Longer maceration, higher temperatures, and thick-skinned varieties produce deeper-colored wines.

65. D. Acetic acid producer - Acetobacter bacteria oxidize ethanol to acetic acid, causing volatile acidity. These aerobic organisms require oxygen, making air exposure the primary risk factor for this spoilage.

66. A. White wine browning - Maderization describes browning in white wines from phenolic oxidation, named after Madeira wine where this process is intentional. In table wines, it indicates oxidative damage.

67. C. Anthocyanin structure - The flavylium cation provides the core structure for anthocyanin color compounds. This positively charged molecule exists in different forms depending on pH, affecting color expression.

68. B. Excess sulfur dioxide - Excessive sulfur dioxide produces burning, pungent, or struck match aromas that irritate the nose and throat. Proper sulfur management balances protection against sensory detection.

69. C. Unfermented sugar - Residual sugar remains when fermentation stops before converting all sugars. This occurs intentionally for sweet wines or unintentionally when fermentation becomes stuck.

70. A. Unintended effervescence - Secondary fermentation in bottle causes unexpected spritz, typically from residual yeast and sugar or malolactic bacteria activity. This indicates instability at bottling and constitutes a fault in still wines.

71. A. Aged sweet wine aroma - Sotolon contributes honey, maple, and curry-like aromas that develop in aged sweet wines and oxidized dry wines. This compound results from chemical reactions during extended aging.

72. B. Alcohol and body - Higher alcohol creates fuller body by increasing viscosity and weight on the palate. Alcohol contributes to the overall perception of richness and texture in wine.

73. B. Deacidification agent - Calcium carbonate is used for deacidification, neutralizing excess acid in cool-climate wines. The reaction precipitates calcium tartrate, reducing total acidity to desired levels.

74. C. Herbaceous Cabernet - Methoxypyrazines create herbaceous, green bell pepper character in Cabernet Sauvignon. Levels decrease with ripening, so pronounced green notes may indicate underripe fruit.

75. B. Phenolic extraction factors - Fermentation temperature and duration most significantly affect phenolic extraction. Higher temperatures and longer skin contact increase tannin and color extraction from grape solids.

76. B. Winemaking science - Enology (or oenology) is the science of winemaking, encompassing wine composition, production, and evaluation. Viticulture, by contrast, focuses on grape growing.

77. B. Smoky oak compound - Guaiacol produces smoky, charred, and toasted aromas in oak-aged wines. This compound forms during barrel toasting and transfers to wine during aging.

78. B. White wine color evolution - White wines darken with age, progressing from pale lemon through gold to amber. This color development results from phenolic oxidation and chemical reactions over time.

79. D. Bitterness source - Monomeric phenols contribute bitterness rather than astringency, which is caused by larger tannin molecules binding salivary proteins. These simpler compounds affect taste rather than tactile sensation.

80. B. Protein instability cause - Heat-unstable grape proteins cause protein haze when wines warm after bottling. Bentonite fining removes these proteins, ensuring wines remain clear throughout their shelf life.

81. C. Vanilla from oak - Vanillin produces characteristic vanilla aromas in oak-aged wines. This compound exists naturally in oak wood and transfers to wine during barrel aging, with concentration depending on toast level.

82. B. MLF acidity effect - Malolactic fermentation decreases total acidity by converting stronger malic acid to weaker lactic acid. One molecule of malic acid becomes one molecule of lactic acid plus carbon dioxide.

83. C. Primary fermentation yeast - Saccharomyces cerevisiae is the primary yeast species for alcoholic fermentation. This domesticated yeast efficiently converts sugars to alcohol while producing desirable flavor compounds.

84. A. Green tinge source - Chlorophyll from grape skins contributes greenish tinge in some young white wines. This color component fades with age as the pigment breaks down.

85. B. Cabbage aroma compound - Dimethyl sulfide at fault levels produces cabbage, cooked corn, and vegetal aromas. Small amounts may add complexity, but elevated levels indicate reductive or bacterial issues.

86. B. Alcohol calories - Alcohol contains approximately 7 calories per gram, placing it between carbohydrates (4 calories/gram) and fat (9 calories/gram). This energy density contributes to wine's caloric content.

87. C. Tertiary aroma development - Bottle aging drives tertiary aroma development as primary fruit compounds transform into complex secondary characteristics. This evolution requires time and appropriate storage conditions.

88. B. Mercaptan formation - Mercaptans form when hydrogen sulfide reacts with wine components, creating more persistent off-aromas than H2S alone. These compounds resist dissipation and indicate more serious reductive problems.

89. A. Free versus bound SO2 - Free sulfur dioxide provides active antimicrobial and antioxidant protection. Bound SO2 has reacted with other wine components and no longer provides protective function.

90. C. Deliberate oxygen exposure - Oxidative handling intentionally exposes wine to oxygen during winemaking, encouraging development of characteristic flavors in styles like Sherry, Vin Jaune, and some Chardonnays.

91. B. Browning phenolics - Hydroxycinnamates are phenolic compounds that oxidize readily, contributing to browning in white wines. Minimizing their oxidation through protective handling maintains fresh color.

92. A. Pinking phenomenon - Residual anthocyanins cause pinking in white wines made from red grapes. These pigments, though present in tiny amounts, can reappear under certain pH or chemical conditions.

93. C. Clove aroma compound - Eugenol contributes clove-like, spicy aromas to oak-aged wines. This phenolic compound occurs naturally in oak and transfers to wine during barrel contact.

94. C. Fining purpose - Fining agents remove unwanted particles, proteins, and phenolics from wine. These substances bind with target compounds, precipitating them for removal and clarifying the finished wine.

95. C. Ethyl acetate complexity - Ethyl acetate at low levels adds fruity complexity but at high levels creates unpleasant nail polish remover aromas. This ester indicates volatile acidity when obviously detectable.

96. B. Grape skin coating - Bloom is the waxy coating on grape skins harboring wild yeasts and providing protection. This natural layer gives grapes their dusty appearance and affects winemaking microbiology.

97. C. Aging potential factors - Structure—the combination of acidity, tannin, and concentration—most determines aging potential. These components preserve wine and evolve positively over time in cellar conditions.

98. A. VA increase mechanism - Acetobacter oxidizes alcohol to acetic acid when wine is exposed to air. These aerobic bacteria require oxygen, making proper storage and full containers essential for prevention.

99. C. High sugar characteristics - Wines with high residual sugar taste sweet and exhibit increased viscosity. The sugar adds both flavor intensity and textural weight perceptible on the palate.

100. C. Ester formation - Esterification is the chemical reaction between acids and alcohols creating fruity ester compounds. This process continues slowly during aging, contributing to aromatic complexity development.

Practice Exam 2: White Grape Varieties

1. Which French region is considered the spiritual homeland of Chardonnay?

A. Loire Valley

B. Burgundy

C. Alsace

D. Rhône Valley

2. What aromatic compound class gives Sauvignon Blanc its distinctive grapefruit and passionfruit aromas?

A. Terpenes

B. Pyrazines

C. Rotundone

D. Thiols

3. Which white grape variety is most associated with the Mosel region of Germany?

A. Riesling

B. Müller-Thurgau

C. Silvaner

D. Grüner Veltliner

4. Pinot Grigio is a genetic mutation of which grape variety?

A. Chardonnay

B. Sauvignon Blanc

C. Pinot Noir

D. Riesling

5. Which country is the largest producer of Chardonnay by volume?

A. United States

B. France

C. Australia

D. Italy

6. What characteristic aroma is most associated with Gewürztraminer?

A. Green apple

B. Lychee

C. Grapefruit

D. Peach

7. In which region does Albariño achieve its finest expression?

A. Rioja

B. Ribera del Duero

C. Penedès

D. Rías Baixas

8. Which grape variety is the primary component of Soave wines?

A. Trebbiano

B. Pinot Grigio

C. Garganega

D. Cortese

9. What is the primary grape variety used in Sancerre?

A. Sauvignon Blanc

B. Chenin Blanc

C. Chardonnay

D. Melon de Bourgogne

10. Which white variety is known for developing petrol or kerosene aromas with age?

A. Chardonnay

B. Riesling

C. Viognier

D. Sémillon

11. Grüner Veltliner is the signature white grape of which country?

A. Germany

B. Switzerland

C. Hungary

D. Austria

12. Which grape variety is responsible for the wines of Condrieu in the Northern Rhône?

A. Marsanne

B. Roussanne

C. Viognier

D. Clairette

13. What is the French name for Chenin Blanc in the Loire Valley's Savennières appellation?

A. Melon

B. Pineau de la Loire

C. Gros Plant

D. Muscadet

14. Which grape variety is most susceptible to noble rot and used in Sauternes?

A. Sémillon

B. Sauvignon Blanc

C. Muscadelle

D. Chenin Blanc

15. Torrontés is the signature white grape variety of which country?

A. Chile

B. Spain

C. Argentina

D. Uruguay

16. Which compound is responsible for the green bell pepper aroma sometimes found in underripe Sauvignon Blanc?

A. Linalool

B. Geraniol

C. Rotundone

D. Methoxypyrazine

17. Assyrtiko is indigenous to which Greek island?

A. Crete

B. Santorini

C. Rhodes

D. Corfu

18. What style of wine is Muscat most commonly associated with?

A. Aromatic and floral

B. Neutral and crisp

C. Full-bodied and oaky

D. Tannic and dry

19. Which variety is the most planted white grape in Bordeaux?

A. Sauvignon Blanc

B. Muscadelle

C. Sémillon

D. Colombard

20. Furmint is the primary grape in which famous sweet wine?

A. Sauternes

B. Eiswein

C. Vin Santo

D. Tokaji Aszú

21. What is the principal white grape variety of Chablis?

A. Chardonnay

B. Aligoté

C. Sauvignon Blanc

D. Pinot Blanc

22. Which white variety is commonly blended with Sémillon in white Bordeaux?

A. Chenin Blanc

B. Muscadelle

C. Sauvignon Blanc

D. Colombard

23. Verdicchio is most associated with which Italian region?

A. Piedmont

B. Marche

C. Tuscany

D. Sicily

24. Which term describes the distinctive white pepper character found in Grüner Veltliner?

A. Mineral

B. Flinty

C. Herbaceous

D. Pfeffrig

25. Verdejo is the signature grape of which Spanish DO?

A. Rueda

B. Rioja

C. Rías Baixas

D. Penedès

26. What is the typical body style of wines made from Muscadet (Melon de Bourgogne)?

A. Full-bodied and oaky

B. Medium-bodied and fruity

C. Light-bodied and crisp

D. Rich and sweet

27. Which grape variety is Ugni Blanc called in Italy?

A. Garganega

B. Vermentino

C. Cortese

D. Trebbiano

28. Fiano is a white grape variety native to which Italian region?

A. Veneto

B. Campania

C. Piedmont

D. Friuli

29. Which white variety is traditionally used to make Champagne alongside Pinot Noir and Pinot Meunier?

A. Chardonnay

B. Chenin Blanc

C. Riesling

D. Aligoté

30. What aromatic profile is most associated with Viognier?

A. Citrus and grassy

B. Green apple and mineral

C. Apricot and honeysuckle

D. Grapefruit and gooseberry

31. Which grape is the primary variety in Gavi wines from Piedmont?

A. Arneis

B. Favorita

C. Moscato

D. Cortese

32. Koshu is a white grape variety indigenous to which country?

A. China

B. Japan

C. South Korea

D. Thailand

33. Which white grape variety has high natural acidity that allows it to age for decades?

A. Riesling

B. Viognier

C. Gewürztraminer

D. Muscat

34. What is the traditional oak treatment for premium Burgundian Chardonnay?

A. No oak contact

B. Large neutral oak

C. American oak barrels

D. French oak barrels with lees stirring

35. Which Alsatian variety is known for producing both dry and sweet wine styles?

A. Sylvaner

B. Pinot Blanc

C. Riesling

D. Chasselas

36. Malvasia is found in wines from all of the following regions EXCEPT:

A. Madeira

B. Mosel

C. Italy

D. Greece

37. Which variety is the most widely planted grape in the world?

A. Airén

B. Chardonnay

C. Sauvignon Blanc

D. Trebbiano

38. What is the characteristic soil type associated with premier Chablis vineyards?

A. Granite

B. Slate

C. Limestone and clay

D. Kimmeridgian marl

39. Vermentino is known by which name in the Provence region of France?

A. Favorita

B. Pigato

C. Rolle

D. Malvoisie

40. Which white variety is often co-fermented with Syrah in the Northern Rhône?

A. Marsanne

B. Viognier

C. Roussanne

D. Clairette

41. Falanghina is indigenous to which Italian region?

A. Sicily

B. Lombardy

C. Piedmont

D. Campania

42. Which Loire Valley appellation is famous for sweet Chenin Blanc wines affected by noble rot?

A. Quarts de Chaume

B. Sancerre

C. Muscadet

D. Pouilly-Fumé

43. What distinguishes Pinot Gris from Pinot Grigio in terms of typical wine style?

A. Pinot Grigio is fuller bodied

B. They are completely different varieties

C. Pinot Gris is typically richer and more full-bodied

D. There is no difference

44. Xarel·lo is one of the three traditional grapes used in which Spanish wine?

A. Sherry

B. Cava

C. Rioja white

D. Rueda

45. Which grape variety is also known as Steen in South Africa?

A. Colombard

B. Sauvignon Blanc

C. Sémillon

D. Chenin Blanc

46. What is the dominant white grape variety of the Hunter Valley in Australia?

A. Sémillon

B. Chardonnay

C. Riesling

D. Verdelho

47. Ribolla Gialla is associated with which Italian region known for orange wines?

A. Tuscany

B. Piedmont

C. Friuli-Venezia Giulia

D. Sicily

48. Which German term indicates a dry style of Riesling?

A. Süss

B. Trocken

C. Halbtrocken

D. Lieblich

49. Carricante is the primary white grape of wines from which volcanic region?

A. Santorini

B. Canary Islands

C. Madeira

D. Mount Etna

50. What is the meaning of "sur lie" aging often used with Muscadet?

A. Aged on the lees

B. Aged in oak

C. Late harvested

D. Botrytis affected

51. Which white grape variety is most planted in New Zealand?

A. Chardonnay

B. Pinot Gris

C. Sauvignon Blanc

D. Riesling

52. Roussanne is typically blended with which other Rhône variety?

A. Viognier

B. Marsanne

C. Clairette

D. Grenache Blanc

53. What is the signature white grape of the Jura region in France?

A. Chardonnay

B. Aligoté

C. Pinot Blanc

D. Savagnin

54. Which variety produces the aromatic dry white wines of Condrieu?

A. Viognier

B. Marsanne

C. Roussanne

D. Clairette

55. Müller-Thurgau was originally thought to be a crossing of Riesling and which other variety?

A. Gewürztraminer

B. Pinot Blanc

C. Silvaner

D. Chasselas

56. Which Italian white variety is used to produce Orvieto wines?

A. Verdicchio

B. Grechetto

C. Fiano

D. Falanghina

57. What gives Pouilly-Fumé its name, referring to a characteristic of the wine?

A. Smoky soil

B. Winemaker's name

C. Village name

D. Smoky or flinty character

58. Jacquère is the principal white grape of which French region?

A. Savoie

B. Alsace

C. Jura

D. Loire Valley

59. Which aromatic compound is responsible for Muscat's distinctive grapey character?

A. Methoxypyrazine

B. Linalool

C. Rotundone

D. Diacetyl

60. Palomino is the primary grape used in the production of which fortified wine?

A. Port

B. Madeira

C. Sherry

D. Marsala

61. What is the primary white grape used in Franciacorta sparkling wines?

A. Pinot Grigio

B. Trebbiano

C. Garganega

D. Chardonnay

62. Which grape variety is known as Weissburgunder in Germany?

A. Pinot Blanc

B. Pinot Gris

C. Chardonnay

D. Riesling

63. Macabeo is most associated with which Spanish wine type?

A. Sherry

B. Cava

C. Rioja red

D. Ribera del Duero

64. What is the distinguishing characteristic of wines made from Gewürztraminer?

A. High acidity

B. Neutral flavor profile

C. Low alcohol and high aromatics

D. Tannic structure

65. Godello has gained recognition in which Spanish region?

A. Rioja

B. Ribera del Duero

C. Rías Baixas

D. Valdeorras

66. Which white grape is used to make Vouvray in the Loire Valley?

A. Chenin Blanc

B. Sauvignon Blanc

C. Melon de Bourgogne

D. Chardonnay

67. Welschriesling is unrelated to Riesling and is most planted in which country?

A. Germany

B. Austria

C. France

D. Australia

68. Which grape variety is used in the production of Vin Santo in Tuscany?

A. Vermentino

B. Vernaccia

C. Trebbiano

D. Garganega

69. Kerner is a crossing developed in Germany from Riesling and which red grape?

A. Pinot Noir

B. Dornfelder

C. Portugieser

D. Schiava (Trollinger)

70. What is the signature white grape of South Africa that has gained international acclaim?

A. Chenin Blanc

B. Sauvignon Blanc

C. Chardonnay

D. Colombard

71. Arinto is an indigenous white grape variety from which country?

A. Spain

B. Portugal

C. Greece

D. Italy

72. Which grape produces the famous white wines of Château d'Yquem?

A. Sauvignon Blanc primarily

B. Muscadelle primarily

C. Sémillon primarily

D. Chenin Blanc primarily

73. What is the literal meaning of the German term "Spätlese"?

A. Ice wine

B. Select harvest

C. Dry wine

D. Late harvest

74. Greco di Tufo is a white grape variety from which Italian region?

A. Campania

B. Calabria

C. Sicily

D. Sardinia

75. Which variety is known for producing exceptionally long-lived dry wines in Savennières?

A. Sauvignon Blanc

B. Chenin Blanc

C. Melon de Bourgogne

D. Chardonnay

76. Rkatsiteli is one of the most ancient grape varieties, originating in which country?

A. Armenia

B. Turkey

C. Georgia

D. Greece

77. What distinguishes the Alsatian style of Pinot Gris from Italian Pinot Grigio?

A. Lower alcohol

B. More acidic

C. Lighter body

D. Fuller body and richer texture

78. Aligoté is a white grape variety that produces which Burgundian wine?

A. Bourgogne Aligoté

B. Chablis

C. Meursault

D. Puligny-Montrachet

79. Which Spanish grape is used to make the sweet wines of Málaga?

A. Airén

B. Pedro Ximénez

C. Palomino

D. Verdejo

80. Fernão Pires is the most widely planted white grape in which country?

A. Spain

B. Italy

C. Portugal

D. Greece

81. What is the primary white grape variety used in Hermitage Blanc?

A. Viognier

B. Clairette

C. Roussanne

D. Marsanne

82. Which grape variety is most associated with the wines of Santorini?

A. Assyrtiko

B. Roditis

C. Moschofilero

D. Malagousia

83. Scheurebe is a German crossing of Riesling and which other grape?

A. Gewürztraminer

B. Silvaner

C. Müller-Thurgau

D. Pinot Blanc

84. What style of wine is Moscato d'Asti?

A. Dry and full-bodied

B. Semi-sparkling and sweet

C. Lightly sweet and still

D. Bone dry and crisp

85. Petit Manseng is known for producing which style of wine in Southwest France?

A. Dry, neutral whites

B. Light, crisp aperitif wines

C. Full-bodied oaked whites

D. Sweet wines with high acidity

86. Which variety is used to produce the dry white wines of Gavi in Piedmont?

A. Cortese

B. Arneis

C. Favorita

D. Timorasso

87. What characteristic climate condition allows Riesling to thrive in the Mosel?

A. Hot and dry summers

B. Mediterranean influence

C. Cool climate with steep slate slopes

D. Tropical humidity

88. Encruzado is gaining recognition as a premium white variety from which country?

A. Spain

B. Portugal

C. Italy

D. Greece

89. Which grape variety is known as Melon de Bourgogne?

A. Aligoté

B. Chardonnay

C. Pinot Blanc

D. Muscadet

90. Grillo is a white grape variety native to which Italian island?

A. Sicily

B. Sardinia

C. Elba

D. Capri

91. What is the traditional winemaking vessel used for fermenting Grüner Veltliner in Austria?

A. Clay amphorae

B. New French oak

C. Large neutral oak or stainless steel

D. Concrete eggs

92. Narince is an indigenous white grape variety from which country?

A. Greece

B. Turkey

C. Lebanon

D. Georgia

93. Which white grape is dominant in the production of Frascati wines near Rome?

A. Verdicchio

B. Trebbiano

C. Greco

D. Malvasia

94. Txakoli is a crisp, slightly sparkling white wine made primarily from which grape?

A. Hondarrabi Zuri

B. Albariño

C. Verdejo

D. Godello

95. What is the primary grape variety in white Châteauneuf-du-Pape?

A. Viognier

B. Marsanne

C. Grenache Blanc and Roussanne

D. Clairette

96. Hárslevelű is a grape variety used alongside Furmint in which wine region?

A. Austria

B. Tokaj

C. Slovenia

D. Croatia

97. Which grape variety produces the Vin Jaune of the Jura region?

A. Chardonnay

B. Aligoté

C. Pinot Blanc

D. Savagnin

98. Malagousia is a recently revived grape variety from which country?

A. Greece

B. Turkey

C. Cyprus

D. Lebanon

99. What is the characteristic that makes Viognier challenging to grow?

A. Requires very cold climates

B. Highly disease resistant

C. Narrow ripening window and low yields

D. Needs sandy soils only

100. Catarratto is one of the most planted white grapes on which Italian island?

A. Sardinia

B. Sicily

C. Elba

D. Pantelleria

Answer Explanations

1. B. Chardonnay homeland - Burgundy is Chardonnay's spiritual homeland, where it produces the world's benchmark white wines from Chablis in the north to the Côte de Beaune's famous villages of Meursault and Puligny-Montrachet.

2. D. Sauvignon Blanc aromatics - Thiols are sulfur-containing compounds responsible for Sauvignon Blanc's distinctive grapefruit, passionfruit, and gooseberry aromas. These volatile compounds are released during fermentation from odorless precursors in the grape.

3. A. Mosel's signature grape - Riesling is synonymous with the Mosel region, where steep slate slopes and cool climate produce wines of exceptional delicacy, piercing acidity, and remarkable aging potential at relatively low alcohol levels.

4. C. Pinot Grigio origin - Pinot Grigio is a color mutation of Pinot Noir, with grayish-pink skins rather than dark blue. The variety shares Pinot Noir's genetic profile but expresses differently in the vineyard and cellar.

5. A. Largest Chardonnay producer - The United States leads global Chardonnay production, with California's vast plantings in regions like Napa, Sonoma, and the Central Coast producing wines ranging from crisp and unoaked to rich and buttery.

6. B. Gewürztraminer character - Lychee is Gewürztraminer's signature aroma, accompanied by rose petal, Turkish delight, and exotic spice notes. These intense aromatics make Gewürztraminer among the most recognizable and distinctive white varieties.

7. D. Albariño region - Rías Baixas in Galicia, northwestern Spain, produces the finest Albariño wines. The cool, Atlantic-influenced climate and granite soils yield aromatic whites with stone fruit character and distinctive salinity.

8. C. Soave grape - Garganega is the primary grape in Soave wines from the Veneto region. The variety produces wines with almond and citrus notes, ranging from simple everyday whites to age-worthy single-vineyard expressions.

9. A. Sancerre grape - Sauvignon Blanc is the exclusive white grape of Sancerre in the Loire Valley. The region's limestone and flint soils produce racy, mineral-driven expressions quite different from New World versions.

10. B. Petrol aroma variety - Riesling develops distinctive petrol or kerosene aromas with age, caused by the compound TDN (trimethyl-dihydronaphthalene). This characteristic, considered typical rather than faulty, indicates bottle development.

11. D. Grüner Veltliner home - Austria claims Grüner Veltliner as its signature grape, with approximately one-third of vineyard area planted to this variety. It produces wines ranging from light and peppery to rich and age-worthy.

12. C. Condrieu grape - Viognier is the sole permitted variety in Condrieu, producing rich, aromatic wines with apricot and honeysuckle character. This Northern Rhône appellation rescued Viognier from near extinction in the twentieth century.

13. B. Chenin Blanc synonym - Pineau de la Loire is the traditional name for Chenin Blanc in the Loire Valley. The variety produces the full spectrum of wine styles from bone-dry Savennières to lusciously sweet Coteaux du Layon.

14. A. Noble rot susceptibility - Sémillon's thin skin makes it highly susceptible to Botrytis cinerea (noble rot), essential for Sauternes production. The variety contributes richness and lanolin character to these legendary sweet wines.

15. C. Torrontés homeland - Argentina claims Torrontés as its signature white grape, likely descended from Muscat of Alexandria. The variety thrives at high altitudes in regions like Salta, producing intensely aromatic, floral wines.

16. D. Green pepper compound - Methoxypyrazines cause green bell pepper and herbaceous aromas in underripe Sauvignon Blanc and Cabernet family grapes. These compounds decrease with grape ripening and sun exposure.

17. B. Assyrtiko origin - Santorini is home to Assyrtiko, where volcanic soils and extreme conditions produce intensely mineral wines with remarkable acidity. The variety has spread throughout Greece but reaches its apex here.

18. A. Muscat style - Muscat is characteristically aromatic and floral, with distinctive grapey character from high terpene content. The large Muscat family produces wines ranging from light and fizzy to rich and fortified.

19. C. Bordeaux white grape - Sémillon is the most planted white grape in Bordeaux, essential for both dry white blends and sweet Sauternes. Its waxy texture and susceptibility to botrytis make it invaluable for sweet wine production.

20. D. Furmint wine - Tokaji Aszú from Hungary features Furmint as its primary grape. The variety's high acidity balances the intense sweetness of these botrytized wines, enabling remarkable aging potential.

21. A. Chablis grape - Chardonnay is the sole grape permitted in Chablis, producing lean, mineral wines quite different from richer Burgundian expressions. Kimmeridgian marl soils contribute distinctive flinty, oyster-shell character.

22. C. Sémillon blending partner - Sauvignon Blanc is commonly blended with Sémillon in white Bordeaux, contributing aromatic lift and freshness to balance Sémillon's weight and texture in both dry and sweet styles.

23. B. Verdicchio region - Marche on Italy's Adriatic coast is home to Verdicchio, producing wines with distinctive almond notes and citrus character. The variety shows excellent aging potential from quality producers.

24. D. Grüner Veltliner descriptor - Pfeffrig, meaning "peppery" in German, describes the characteristic white pepper note in Grüner Veltliner. This spicy quality distinguishes the variety and complements its citrus and lentil flavors.

25. A. Verdejo region - Rueda in Castilla y León is Spain's premier region for Verdejo, producing aromatic whites with fennel, citrus, and herbal character. The variety has become Spain's most fashionable indigenous white grape.

26. C. Muscadet body - Muscadet wines from Melon de Bourgogne are characteristically light-bodied and crisp, with high acidity and subtle flavors. Sur lie aging adds texture and complexity to these Atlantic-influenced wines.

27. D. Ugni Blanc Italian name - Trebbiano is the Italian name for Ugni Blanc, one of the world's most planted white varieties. In France, it's primarily used for Cognac and Armagnac distillation; in Italy, for light table wines.

28. B. Fiano origin - Campania in southern Italy is home to Fiano, producing aromatic whites with honey, hazelnut, and mineral character. The variety has gained international recognition for its complexity and aging potential.

29. A. Champagne white grape - Chardonnay is the primary white grape in Champagne, contributing elegance and citrus character to blends. Blanc de Blancs Champagnes are made exclusively from Chardonnay.

30. C. Viognier aromatics - Apricot and honeysuckle define Viognier's aromatic profile, along with peach, orange blossom, and spice notes. These rich aromatics combine with full body and low acidity in typical examples.

31. D. Gavi grape - Cortese produces Gavi wines in Piedmont, offering crisp, mineral whites with citrus and almond notes. The variety provides refreshing contrast to the region's powerful red wines.

32. B. Koshu origin - Japan claims Koshu as its indigenous variety, likely introduced via the Silk Road over a thousand years ago. The grape produces delicate, subtle wines with citrus and mineral character.

33. A. Aging white variety - Riesling's exceptionally high natural acidity enables aging for decades, developing complex petrol, honey, and dried fruit character while maintaining freshness. Few white varieties match its longevity.

34. D. Burgundy Chardonnay treatment - French oak barrels with lees stirring (bâtonnage) represent the traditional treatment for premium white Burgundy. This combination adds richness, toast notes, and creamy texture to Chardonnay.

35. C. Alsatian dry and sweet - Riesling in Alsace produces the full range from bone-dry to intensely sweet Vendange Tardive and Sélection de Grains Nobles. The variety's high acidity balances sweetness at every level.

36. B. Malvasia absence - Malvasia is not found in the Mosel, which is devoted almost exclusively to Riesling. The variety appears in Madeira, throughout Italy, and in Greece, producing diverse wine styles.

37. A. Most planted grape - Airén is the world's most planted grape variety by vineyard area, concentrated in Spain's La Mancha region. Much production goes to brandy distillation rather than table wine.

38. D. Chablis soil - Kimmeridgian marl, a limestone-rich soil containing ancient oyster fossils, underlies the finest Chablis vineyards. This distinctive terroir contributes the region's characteristic mineral, flinty character.

39. C. Vermentino French name - Rolle is Vermentino's name in Provence, where it produces aromatic whites with citrus and herbal character. The same variety is called Favorita in Piedmont and Pigato in Liguria.

40. B. Syrah co-fermentation - Viognier is traditionally co-fermented with Syrah in Côte-Rôtie (up to 20%), stabilizing color and adding aromatic complexity. This unusual practice enhances rather than dilutes the red wine.

41. D. Falanghina home - Campania in southern Italy is home to Falanghina, an ancient variety producing fresh, aromatic whites with floral and citrus character. The grape has experienced significant revival in recent decades.

42. A. Sweet Chenin appellation - Quarts de Chaume is a prestigious Loire appellation producing exclusively sweet Chenin Blanc affected by noble rot. These concentrated, long-lived wines rank among France's finest dessert wines.

43. C. Pinot Gris versus Grigio - Pinot Gris (Alsace style) is typically richer and more full-bodied than Italian Pinot Grigio, which emphasizes crispness and lightness. The same grape expresses differently based on winemaking philosophy.

44. B. Xarel·lo wine - Cava, Spain's traditional method sparkling wine, uses Xarel·lo alongside Macabeo and Parellada. Xarel·lo contributes body and earthiness to the blend, providing structure for aging.

45. D. Steen identity - Chenin Blanc is called Steen in South Africa, where it's the most planted variety. South African Chenin ranges from simple everyday wines to complex, age-worthy expressions rivaling Loire Valley benchmarks.

46. A. Hunter Valley white - Sémillon is Hunter Valley's signature white grape, producing unique wines picked early at low sugar levels that develop extraordinary honeyed complexity with extended bottle age.

47. C. Ribolla Gialla region - Friuli-Venezia Giulia is home to Ribolla Gialla, where it's used for both conventional white wines and extended skin-contact "orange" wines that have gained international attention.

48. B. German dry term - Trocken indicates dry style in German wine labeling, with residual sugar below 9 g/L. This term helps consumers navigate German wines, which range from dry to intensely sweet.

49. D. Carricante home - Mount Etna in Sicily is home to Carricante, where volcanic soils produce distinctive whites with citrus, mineral, and saline character. The variety has gained recognition as Etna wines rise in prestige.

50. A. Sur lie meaning - Sur lie means "on the lees," indicating wine aged in contact with dead yeast cells after fermentation. This practice adds texture, complexity, and subtle bread-like notes to Muscadet.

51. C. New Zealand white grape - Sauvignon Blanc dominates New Zealand wine production, with Marlborough examples redefining global expectations for the variety. Intense tropical and herbaceous character distinguishes these wines.

52. B. Roussanne blending - Marsanne is Roussanne's traditional blending partner in white Rhône wines. Marsanne contributes body and almond notes while Roussanne adds acidity and herbal complexity.

53. D. Jura white grape - Savagnin is the Jura's signature white variety, used for both conventional wines and the oxidative Vin Jaune. The grape produces wines with distinctive nutty, curry-like character.

54. A. Condrieu variety - Viognier is the exclusive grape of Condrieu, producing rich, aromatic whites that rescued the variety from near extinction. These wines show apricot, peach, and floral character.

55. C. Müller-Thurgau parentage - Müller-Thurgau was long thought to be a Riesling-Silvaner crossing, but DNA analysis revealed Riesling and Madeleine Royale parentage. The variety produces soft, floral wines.

56. B. Orvieto grape - Grechetto is blended with Trebbiano to produce Orvieto wines in Umbria. The variety contributes more character and structure than neutral Trebbiano, improving blend quality.

57. D. Pouilly-Fumé name origin - Pouilly-Fumé's name refers to the "smoky" or flinty character of its Sauvignon Blanc wines, possibly from flint soils or the bloom on ripe grapes resembling smoke.

58. A. Jacquère region - Savoie in the French Alps features Jacquère as its principal white variety, producing light, crisp wines with citrus and mineral character suited to local cuisine.

59. B. Muscat aroma compound - Linalool is the primary terpene responsible for Muscat's

distinctive grapey, floral aromatics. This compound defines the variety's recognizable character across all Muscat family members.

60. C. Palomino wine - Sherry production relies on Palomino, which produces neutral base wines ideal for transformation through the solera system. The variety's neutrality allows flor and oxidation to define final character.

61. D. Franciacorta grape - Chardonnay is the primary variety in Franciacorta, Italy's premier traditional method sparkling wine. The variety contributes elegance and aging potential to these prestigious wines.

62. A. Weissburgunder identity - Pinot Blanc is called Weissburgunder in Germany and Austria, producing medium-bodied wines with apple and almond character. The variety also appears in Alsace and northern Italy.

63. B. Macabeo wine - Cava production features Macabeo (also called Viura) as a key variety alongside Xarel·lo and Parellada. Macabeo contributes floral aromatics and freshness to the blend.

64. C. Gewürztraminer distinction - Low acidity combined with intensely aromatic character distinguishes Gewürztraminer. The variety's bold lychee and rose petal flavors require this lower acid structure for balance.

65. D. Godello recognition - Valdeorras in Galicia has become recognized for quality Godello, producing aromatic whites with stone fruit and mineral character. The variety has experienced significant quality revival.

66. A. Vouvray grape - Chenin Blanc is the sole variety in Vouvray, producing the full range from dry to sweet, still to sparkling. The appellation showcases Chenin Blanc's remarkable versatility.

67. B. Welschriesling country - Austria plants more Welschriesling than any other country, using it for everyday wines and sweet botrytized productions. Despite its name, the variety is unrelated to true Riesling.

68. C. Vin Santo grape - Trebbiano (along with Malvasia) produces Vin Santo in Tuscany. The grapes are dried before pressing, concentrating sugars for this traditional sweet wine aged in small barrels.

69. D. Kerner parentage - Kerner is a German crossing of Riesling and Schiava (Trollinger), producing aromatic wines with Riesling-like character. The variety tolerates cooler sites than Riesling.

70. A. South Africa white grape - Chenin Blanc (locally called Steen) is South Africa's most acclaimed white variety, producing wines ranging from crisp and fresh to rich and complex, particularly from old Swartland vines.

71. B. Arinto origin - Portugal claims Arinto as an indigenous variety, valued for maintaining high acidity even in warm conditions. The grape produces fresh, citrus-driven wines with aging potential.

72. C. Château d'Yquem grape - Sémillon is the primary grape at Château d'Yquem, typically comprising 80% of the blend. Its susceptibility to botrytis and rich texture make it essential for this legendary Sauternes.

73. D. Spätlese meaning - Spätlese means "late harvest" in German, indicating grapes picked after the main harvest with higher ripeness. Wines may be fermented dry or retain sweetness.

74. A. Greco di Tufo region - Campania in southern Italy produces Greco di Tufo, named for the volcanic tufo soil. The variety makes structured, mineral whites with citrus and almond character.

75. B. Savennières grape - Chenin Blanc produces the exceptionally long-lived dry wines of Savennières in the Loire Valley. High acidity and concentration enable these wines to develop for decades.

76. C. Rkatsiteli origin - Georgia claims Rkatsiteli as one of the world's most ancient varieties, with cultivation dating back thousands of years. The grape remains widely planted across Eastern Europe.

77. D. Alsatian Pinot Gris style - Alsatian Pinot Gris is typically fuller-bodied and richer than Italian Pinot Grigio, with more pronounced fruit character and often slight sweetness. Different winemaking traditions create distinct styles.

78. A. Aligoté wine - Bourgogne Aligoté is Burgundy's designation for wines from the Aligoté grape, producing crisp, high-acid whites traditionally mixed with cassis liqueur to make Kir.

79. B. Málaga grape - Pedro Ximénez produces sweet Málaga wines in southern Spain, where grapes are sun-dried to concentrate sugars. The same variety is essential for sweet Sherry production.

80. C. Fernão Pires country - Portugal grows more Fernão Pires than any other white variety, producing aromatic wines with floral and citrus character. The grape is also called Maria Gomes in Bairrada.

81. D. Hermitage Blanc grape - Marsanne is the dominant variety in white Hermitage, producing rich, full-bodied wines with almond and white flower character. Roussanne may be blended in smaller proportions.

82. A. Santorini grape - Assyrtiko defines Santorini wines, producing intensely mineral whites with remarkable acidity despite the hot climate. Volcanic soils and ancient bush vines contribute distinctive character.

83. B. Scheurebe parentage - Scheurebe is a Riesling-Silvaner crossing created in Germany, producing aromatic wines with grapefruit and blackcurrant character. The variety excels for both dry and sweet wines.

84. C. Moscato d'Asti style - Moscato d'Asti is a lightly sweet, gently sparkling (frizzante) wine from Piedmont. Low alcohol (around 5.5%) and

delicate Muscat aromatics make it refreshing and approachable.

85. D. Petit Manseng style - Petit Manseng produces sweet wines with high acidity in Southwest France, particularly Jurançon. Small berries concentrate sugars while retaining freshness for balanced dessert wines.

86. A. Gavi grape - Cortese is the sole variety in Gavi wines from Piedmont, producing crisp, mineral whites with citrus and almond notes. Quality ranges from simple to age-worthy examples.

87. C. Mosel Riesling conditions - Cool climate with steep slate slopes characterizes the Mosel, where southern exposures maximize sun capture in this marginal northern region. Slate retains and radiates heat.

88. B. Encruzado country - Portugal's Dão region has gained recognition for premium Encruzado, producing complex, age-worthy whites with citrus, mineral, and subtle smoky character.

89. D. Melon de Bourgogne synonym - Muscadet is the wine name for Melon de Bourgogne, grown almost exclusively in the Loire Valley near Nantes. The grape's name reflects its Burgundian origin before transplantation.

90. A. Grillo island - Sicily is home to Grillo, traditionally used for Marsala production but increasingly vinified as a dry table wine with citrus and herbal character.

91. C. Austrian Grüner fermentation - Large neutral oak or stainless steel is traditional for Grüner Veltliner, preserving the variety's fresh, peppery character. New oak would overwhelm its delicate aromatics.

92. B. Narince origin - Turkey claims Narince as an indigenous variety, producing aromatic whites from the Tokat region. The grape is considered one of Turkey's finest white varieties.

93. D. Frascati grape - Malvasia (with Trebbiano) produces Frascati near Rome, creating soft, almond-scented whites. The wine has been enjoyed in Rome for centuries as a local specialty.

94. A. Txakoli grape - Hondarrabi Zuri is the primary grape in Txakoli, the Basque Country's refreshing, slightly spritzy white. The wine's crisp acidity complements the region's seafood cuisine.

95. C. White Châteauneuf grapes - Grenache Blanc and Roussanne are primary varieties in white Châteauneuf-du-Pape, among 13 permitted varieties. These full-bodied whites show stone fruit and herbal complexity.

96. B. Hárslevelű region - Tokaj uses Hárslevelű alongside Furmint, where it contributes floral aromatics to both dry and sweet wines. The variety's name means "linden leaf" in Hungarian.

97. D. Vin Jaune grape - Savagnin produces Vin Jaune in the Jura, aged under a flor veil for

minimum six years. The resulting oxidative wine shows distinctive nutty, curry-like character.

98. A. Malagousia revival - Greece recently revived Malagousia from near extinction, with Domaine Carras rescuing the variety in the 1970s. The grape produces aromatic whites with peach and jasmine notes.

99. C. Viognier challenges - Viognier's narrow ripening window and tendency toward low yields make it challenging to grow. The variety quickly loses acidity if harvested late but lacks flavor if picked early.

100. B. Catarratto location - Sicily plants more Catarratto than almost any other white variety, traditionally used for Marsala and vermouth production. Increasingly, quality dry table wines emerge from the grape.

Practice Exam 3: Red Grape Varieties

1. Which region is considered the spiritual homeland of Cabernet Sauvignon?

A. Rioja

B. Piedmont

C. Bordeaux

D. Burgundy

2. What is the primary red grape variety of Burgundy?

A. Pinot Noir

B. Gamay

C. Cabernet Franc

D. Merlot

3. Shiraz is the Australian name for which grape variety?

A. Grenache

B. Mourvèdre

C. Carignan

D. Syrah

4. Which grape variety is the most planted red variety in Bordeaux?

A. Cabernet Sauvignon

B. Merlot

C. Cabernet Franc

D. Petit Verdot

5. Nebbiolo is the sole grape variety used in which prestigious Italian wine?

A. Chianti Classico

B. Amarone

C. Barolo

D. Brunello di Montalcino

6. What is the signature red grape variety of Argentina?

A. Malbec

B. Bonarda

C. Tempranillo

D. Carmenère

7. Which grape variety was rediscovered in Chile after being thought extinct in Bordeaux?

A. Malbec

B. Carmenère

C. Petit Verdot

D. Tannat

8. Sangiovese is the primary grape in all of the following wines EXCEPT:

A. Chianti

B. Brunello di Montalcino

C. Vino Nobile di Montepulciano

D. Barolo

9. Which compound is responsible for the black pepper aroma found in cool-climate Syrah?

A. Rotundone

B. Linalool

C. Methoxypyrazine

D. Thiols

10. Tempranillo is the primary grape variety of which Spanish wine region?

A. Priorat

B. Rías Baixas

C. Rioja

D. Sherry

11. What is Pinot Noir's relationship to Chardonnay?

A. They are genetically identical

B. Pinot Noir is a parent of Chardonnay

C. They are completely unrelated

D. Chardonnay is a parent of Pinot Noir

12. Which grape variety is known as Cot in France and Malbec in Argentina?

A. Carmenère

B. Tannat

C. Petit Verdot

D. Malbec/Cot

13. Grenache originated in which country?

A. Spain

B. France

C. Italy

D. Portugal

14. What is the Italian name for the grape known as Primitivo?

A. Negroamaro

B. Primitivo

C. Sangiovese

D. Montepulciano

15. Which Bordeaux grape variety is known for adding color and structure to blends?

A. Merlot

B. Cabernet Franc

C. Petit Verdot

D. Carmenère

16. Mourvèdre is known by which name in Spain?

A. Garnacha

B. Cariñena

C. Tempranillo

D. Monastrell

17. Which red grape variety produces the lightest-colored wines?

A. Malbec

B. Pinot Noir

C. Syrah

D. Petit Verdot

18. Gamay is the exclusive red grape of which French wine region?

A. Beaujolais

B. Burgundy

C. Loire Valley

D. Rhône Valley

19. What characteristic distinguishes Cabernet Franc from Cabernet Sauvignon?

A. Higher tannins

B. Darker color

C. More herbaceous and lighter body

D. Higher alcohol potential

20. Zinfandel is genetically identical to which Italian grape?

A. Negroamaro

B. Sangiovese

C. Nero d'Avola

D. Primitivo

21. Which grape variety dominates plantings in Châteauneuf-du-Pape?

A. Syrah

B. Grenache

C. Mourvèdre

D. Cinsault

22. Pinotage is a crossing of Pinot Noir and which other variety?

A. Cinsault

B. Grenache

C. Carignan

D. Mourvèdre

23. Which grape variety is most associated with the Douro Valley for table wines?

A. Tempranillo

B. Tinta Barroca

C. Trincadeira

D. Touriga Nacional

24. What is the primary grape variety in Amarone della Valpolicella?

A. Sangiovese

B. Nebbiolo

C. Corvina

D. Montepulciano

25. Cabernet Sauvignon is a natural crossing of Cabernet Franc and which variety?

A. Merlot

B. Sauvignon Blanc

C. Petit Verdot

D. Carmenère

26. Which Australian region is most famous for old-vine Shiraz?

A. Barossa Valley

B. Margaret River

C. Yarra Valley

D. Hunter Valley

27. Tannat is the signature grape variety of which country?

A. Argentina

B. Chile

C. Brazil

D. Uruguay

28. What is the local name for Tempranillo in Ribera del Duero?

A. Ull de Llebre

B. Aragonez

C. Tinto Fino

D. Cencibel

29. Which grape variety produces the wines of Hermitage in the Northern Rhône?

A. Grenache

B. Syrah

C. Mourvèdre

D. Viognier

30. Aglianico is often called the "Barolo of the South" and is native to which region?

A. Campania

B. Sicily

C. Puglia

D. Calabria

31. What characteristic aroma is associated with Cabernet Sauvignon?

A. Strawberry and rose

B. Cherry and tar

C. Blackcurrant and cedar

D. Plum and chocolate

32. Which grape variety is the most planted in the world by vineyard area?

A. Merlot

B. Tempranillo

C. Pinot Noir

D. Cabernet Sauvignon

33. Nero d'Avola is indigenous to which Italian island?

A. Sardinia

B. Sicily

C. Elba

D. Pantelleria

34. What is the primary grape in traditional Chianti Classico?

A. Sangiovese

B. Montepulciano

C. Nebbiolo

D. Barbera

35. Which grape variety is most associated with the Willamette Valley in Oregon?

A. Cabernet Sauvignon

B. Syrah

C. Pinot Noir

D. Merlot

36. Xinomavro is the principal red grape of which country?

A. Turkey

B. Cyprus

C. Lebanon

D. Greece

37. Which Rhône variety is permitted to be co-fermented with Syrah in Côte-Rôtie?

A. Viognier

B. Marsanne

C. Roussanne

D. Grenache Blanc

38. Blaufränkisch is known by which name in Austria's neighbor Hungary?

A. Zweigelt

B. Kékfrankos

C. St. Laurent

D. Kadarka

39. What is the typical body style of wines made from Merlot?

A. Light and delicate

B. High acid and tannic

C. Austere and angular

D. Medium to full with soft tannins

40. Which grape variety is the primary component of Super Tuscan wines like Sassicaia?

A. Sangiovese

B. Merlot

C. Cabernet Sauvignon

D. Syrah

41. Graciano is used as a blending grape in which Spanish region?

A. Priorat

B. Rioja

C. Ribera del Duero

D. Jumilla

42. Which grape variety produces the rosé wines of Tavel in the Southern Rhône?

A. Grenache

B. Syrah

C. Mourvèdre

D. Cinsault

43. Baga is a tannic red grape native to which Portuguese region?

A. Douro

B. Alentejo

C. Dão

D. Bairrada

44. What is the signature characteristic of wines made from Nebbiolo?

A. Deep purple color

B. Low tannins

C. High tannins and acidity with pale color

D. Jammy fruit character

45. Which grape variety is most planted in California?

A. Merlot

B. Cabernet Sauvignon

C. Pinot Noir

D. Zinfandel

46. Cinsault is an important blending grape in all of the following EXCEPT:

A. Barolo

B. Châteauneuf-du-Pape

C. South African Cape Blends

D. Languedoc

47. Which Italian variety is known for producing deeply colored wines with bitter cherry character?

A. Nebbiolo

B. Sangiovese

C. Montepulciano

D. Barbera

48. Mencía is associated with which Spanish region?

A. Rioja

B. Ribera del Duero

C. Priorat

D. Bierzo

49. What is the primary red grape variety of the Médoc region in Bordeaux?

A. Merlot

B. Cabernet Sauvignon

C. Cabernet Franc

D. Petit Verdot

50. Which grape variety is known for its distinctive tar and roses aromatic profile?

A. Nebbiolo

B. Sangiovese

C. Barbera

D. Dolcetto

51. Carignan is known by which name in Spain?

A. Garnacha

B. Monastrell

C. Tempranillo

D. Cariñena

52. Which grape variety dominates the Right Bank appellations of Bordeaux?

A. Cabernet Sauvignon

B. Petit Verdot

C. Merlot

D. Cabernet Franc

53. Zweigelt is the most planted red grape variety in which country?

A. Germany

B. Austria

C. Switzerland

D. Hungary

54. What is the primary grape variety in Valpolicella wines?

A. Corvina

B. Rondinella

C. Molinara

D. Sangiovese

55. Which grape variety is most associated with the Priorat region of Spain?

A. Tempranillo

B. Monastrell

C. Cabernet Sauvignon

D. Garnacha

56. Sagrantino is a tannic red variety native to which Italian region?

A. Piedmont

B. Tuscany

C. Umbria

D. Marche

57. Which grape produces the light, fruity wines of Beaujolais using carbonic maceration?

A. Pinot Noir

B. Gamay

C. Syrah

D. Grenache

58. What is the name for Tempranillo in Portugal?

A. Aragonez

B. Tinto Fino

C. Cencibel

D. Ull de Llebre

59. Plavac Mali is a red grape variety native to which country?

A. Slovenia

B. Greece

C. Croatia

D. Montenegro

60. Which grape variety is one of the five principal red grapes permitted in Bordeaux blends?

A. Syrah

B. Grenache

C. Cabernet Sauvignon

D. Malbec

61. Dolcetto is a red grape variety from which Italian region?

A. Tuscany

B. Piedmont

C. Veneto

D. Sicily

62. What does the name "Tempranillo" refer to?

A. Early ripening

B. Dark color

C. Thick skin

D. High tannin

63. Which grape variety is the primary component of Côtes du Rhône red wines?

A. Syrah

B. Mourvèdre

C. Grenache

D. Cinsault

64. Petite Sirah in California is typically which grape variety?

A. Syrah

B. Grenache

C. Mourvèdre

D. Durif

65. Which red variety is most associated with New Zealand's Martinborough region?

A. Cabernet Sauvignon

B. Pinot Noir

C. Syrah

D. Merlot

66. Kadarka is a red grape variety historically important in which wine?

A. Egri Bikavér (Bull's Blood)

B. Tokaji

C. Grüner Veltliner

D. Zweigelt

67. What is the primary characteristic of wines made from Barbera?

A. High tannin

B. Pale color

C. Low alcohol

D. High acidity with low tannin

68. Which grape variety is used to make the red wines of Bandol in Provence?

A. Grenache

B. Syrah

C. Mourvèdre

D. Cinsault

69. Trollinger is the German name for which grape variety?

A. Schiava

B. Zweigelt

C. Dornfelder

D. Spätburgunder

70. Which grape variety produces deeply colored, full-bodied wines in Cahors, France?

A. Tannat

B. Malbec

C. Cabernet Franc

D. Négrette

71. St. Laurent is a red grape variety most associated with which country?

A. France

B. Italy

C. Spain

D. Austria

72. What is the relationship between Pinot Noir, Pinot Gris, and Pinot Blanc?

A. Completely different varieties

B. Different clones

C. Color mutations of the same variety

D. Parent and offspring

73. Which grape variety is most associated with the Médoc classification of 1855?

A. Cabernet Sauvignon

B. Merlot

C. Cabernet Franc

D. Petit Verdot

74. Tinta Roriz is another name for which grape variety?

A. Touriga Nacional

B. Tempranillo

C. Tinta Barroca

D. Trincadeira

75. Which Italian grape variety is known for producing light, early-drinking wines with almond notes?

A. Nebbiolo

B. Sangiovese

C. Barbera

D. Dolcetto

76. Garnacha Tintorera is unusual because it is a what?

A. White grape

B. Seedless variety

C. Teinturier (red-fleshed) grape

D. Hybrid variety

77. What is the signature red grape of South Africa?

A. Pinotage

B. Shiraz

C. Cabernet Sauvignon

D. Cinsault

78. Which grape variety is most associated with Washington State?

A. Pinot Noir

B. Merlot

C. Zinfandel

D. Sangiovese

79. Frappato is a light red variety native to which Italian island?

A. Sardinia

B. Elba

C. Sicily

D. Pantelleria

80. Which grape variety is the dominant red in the Southern Rhône Valley?

A. Syrah

B. Mourvèdre

C. Cinsault

D. Grenache

81. What is the common name for Spätburgunder?

A. Pinot Noir

B. Pinot Gris

C. Pinot Blanc

D. Gamay

82. Nerello Mascalese is associated with wines from which volcanic region?

A. Santorini

B. Mount Etna

C. Canary Islands

D. Madeira

83. Which grape variety is most associated with the Colchagua Valley in Chile?

A. Merlot

B. Pinot Noir

C. Carmenère

D. Malbec

84. Touriga Franca is an important grape variety for which wine style?

A. Vinho Verde

B. Dão reds

C. Madeira

D. Port

85. What distinguishes Syrah from Shiraz in terms of wine style?

A. Syrah typically refers to cooler-climate, more elegant styles

B. They are completely different grape varieties

C. Shiraz is always sweet

D. Syrah is only grown in France

86. Which red grape variety is most planted in the Languedoc region of France?

A. Syrah

B. Carignan

C. Grenache

D. Mourvèdre

87. Lagrein is a red grape variety native to which Italian region?

A. Piedmont

B. Tuscany

C. Alto Adige

D. Sicily

88. Which grape produces the base wine for most red Port?

A. Tinta Barroca

B. Tinta Roriz

C. Trincadeira

D. Touriga Nacional

89. What characteristic is most associated with wines made from Cabernet Franc in the Loire Valley?

A. Herbaceous and lighter-bodied with graphite notes

B. Deeply colored and tannic

C. High alcohol and jammy fruit

D. Oxidative and nutty

90. Bonarda is one of the most planted red grapes in which country?

A. Chile

B. Argentina

C. Uruguay

D. Brazil

91. Which grape variety is Petite Verdot primarily used for in Bordeaux?

A. Rosé production

B. Sparkling wine

C. Early-drinking reds

D. Adding color and structure to blends

92. Negroamaro is native to which Italian region?

A. Campania

B. Sicily

C. Puglia

D. Calabria

93. Which red grape variety is most associated with the Clare Valley in Australia?

A. Shiraz

B. Cabernet Sauvignon

C. Grenache

D. Pinot Noir

94. Teroldego is a red grape variety native to which Italian region?

A. Piedmont

B. Trentino

C. Tuscany

D. Veneto

95. What is the typical climate preference for Pinot Noir to produce quality wines?

A. Hot and dry

B. Mediterranean

C. Tropical

D. Cool climate

96. Mavrud is an indigenous red grape variety from which country?

A. Greece

B. Turkey

C. Bulgaria

D. Romania

97. Which grape variety is the primary component of Vino Nobile di Montepulciano?

A. Sangiovese

B. Montepulciano

C. Nebbiolo

D. Corvina

98. Counoise is a permitted blending grape in which French appellation?

A. Bordeaux

B. Châteauneuf-du-Pape

C. Burgundy

D. Alsace

99. What gives Pinot Noir its characteristic aromatic profile?

A. Thick skins and high tannins

B. Late harvest

C. Thin skins and moderate tannins

D. Carbonic maceration

100. Which grape variety is known as the "King of Grapes" in Piedmont?

A. Barbera

B. Dolcetto

C. Sangiovese

D. Nebbiolo

Answer Explanations

1. C. Cabernet Sauvignon homeland - Bordeaux is Cabernet Sauvignon's spiritual homeland, where it dominates Left Bank appellations like Médoc and Graves. The variety achieves benchmark expressions in Pauillac, Saint-Julien, and other prestigious communes.

2. A. Burgundy red grape - Pinot Noir is the exclusive red grape of Burgundy's Côte d'Or, producing the world's most celebrated expressions of the variety from villages like Gevrey-Chambertin, Vosne-Romanée, and Volnay.

3. D. Shiraz identity - Syrah is called Shiraz in Australia, where it produces the country's most iconic wines. The same grape expresses differently in warm Australian conditions versus cooler Rhône Valley climates.

4. B. Bordeaux most planted red - Merlot is the most planted red variety in Bordeaux, dominating Right Bank appellations like Saint-Émilion and Pomerol while playing supporting roles in Left Bank blends.

5. C. Nebbiolo wine - Barolo requires 100% Nebbiolo by regulation, producing powerful, tannic wines from Piedmont's Langhe hills. Barbaresco, Roero, and other DOCG wines also feature this noble variety.

6. A. Argentina signature grape - Malbec defines Argentine wine internationally, thriving in Mendoza's high-altitude vineyards where it produces fuller, riper wines than its French homeland of Cahors.

7. B. Chilean rediscovery - Carmenère was rediscovered in Chilean vineyards in 1994 after being thought extinct in Bordeaux following phylloxera. Previously confused with Merlot, it now represents Chile's signature variety.

8. D. Non-Sangiovese wine - Barolo is made from Nebbiolo, not Sangiovese. Chianti, Brunello di Montalcino, and Vino Nobile di Montepulciano all feature Sangiovese as their primary grape.

9. A. Black pepper compound - Rotundone is responsible for the black pepper aroma distinctive to cool-climate Syrah, particularly from the Northern Rhône. Sensitivity to this compound varies among individuals.

10. C. Tempranillo region - Rioja is Spain's most famous Tempranillo region, where the variety produces age-worthy wines ranging from fresh Joven to complex Gran Reserva bottlings.

11. B. Pinot Noir and Chardonnay relationship - Pinot Noir is a parent of Chardonnay, which resulted from a natural crossing between Pinot Noir and the obscure variety Gouais Blanc in Burgundy centuries ago.

12. D. Cot/Malbec identity - Malbec and Cot are the same grape variety. Cot remains the official French name, while Malbec dominates international usage, particularly associated with Argentine wines.

13. A. Grenache origin - Spain is Grenache's homeland, where it's known as Garnacha. The variety spread to France's Rhône Valley and beyond, becoming one of the world's most planted red grapes.

14. B. Primitivo identity - Primitivo is the Italian name for this grape, which is genetically identical to California's Zinfandel. Both trace ancestry to the Croatian grape Crljenak Kaštelanski.

15. C. Petit Verdot role - Petit Verdot adds deep color, structure, and violet aromatics to Bordeaux blends, typically comprising small percentages due to its late ripening in the region's climate.

16. D. Mourvèdre Spanish name - Monastrell is Mourvèdre's Spanish name, where it thrives in warm regions like Jumilla and Yecla. The same grape produces Bandol's powerful reds in Provence.

17. B. Lightest red variety - Pinot Noir produces the lightest-colored red wines due to its thin skins and lower anthocyanin content. This translucent quality contrasts sharply with deeply pigmented varieties like Malbec.

18. A. Gamay region - Beaujolais exclusively uses Gamay for its red wines, from simple Beaujolais Nouveau to age-worthy Cru bottlings from villages like Morgon and Moulin-à-Vent.

19. C. Cabernet Franc character - Cabernet Franc is more herbaceous and lighter-bodied than Cabernet Sauvignon, with distinctive graphite and violet notes. It ripens earlier and thrives in cooler conditions.

20. D. Zinfandel genetic match - Primitivo and Zinfandel are genetically identical, confirmed through DNA analysis. Both descend from the Croatian variety Crljenak Kaštelanski (also called Tribidrag).

21. B. Châteauneuf-du-Pape grape - Grenache dominates Châteauneuf-du-Pape plantings, providing the warm, generous fruit character that defines these Southern Rhône wines, often blended with Syrah and Mourvèdre.

22. A. Pinotage parentage - Pinotage is a 1925 crossing of Pinot Noir and Cinsault (then called Hermitage), created in South Africa. The variety remains almost exclusively South African.

23. D. Douro table wine grape - Touriga Nacional is the Douro's most prestigious grape for both Port and table wines. It produces deeply colored, aromatic wines with structure and aging potential.

24. C. Amarone grape - Corvina is the primary grape in Amarone della Valpolicella, contributing cherry fruit and structure to these rich, powerful wines made from dried grapes.

25. B. Cabernet Sauvignon parentage - Cabernet Sauvignon is a natural crossing of Cabernet Franc and Sauvignon Blanc, confirmed through DNA analysis in 1996. This explains shared aromatic characteristics.

26. A. Old-vine Shiraz region - Barossa Valley is famous for old-vine Shiraz, with some plantings exceeding 150 years. These ancient vines produce intensely concentrated wines unique to the region.

27. D. Tannat country - Uruguay claims Tannat as its signature grape, producing structured, tannic wines from this variety brought by Basque immigrants from Southwest France.

28. C. Tempranillo Ribera name - Tinto Fino (or Tinta del País) is Tempranillo's name in Ribera del Duero, where it produces darker, more powerful wines than typical Rioja examples.

29. B. Hermitage grape - Syrah is the sole red grape of Hermitage, producing the Northern Rhône's most powerful and long-lived wines. Small amounts of white Marsanne and Roussanne may be co-fermented.

30. A. Aglianico region - Campania is home to Aglianico, particularly the Taurasi DOCG. The variety's high tannins and acidity earn comparisons to Nebbiolo, hence "Barolo of the South."

31. C. Cabernet Sauvignon aroma - Blackcurrant (cassis) and cedar are signature Cabernet Sauvignon aromas, reflecting both varietal character and the variety's affinity for oak aging.

32. D. Most planted grape - Cabernet Sauvignon is the world's most planted wine grape variety, found in virtually every wine-producing country due to its adaptability and market demand.

33. B. Nero d'Avola home - Sicily is home to Nero d'Avola, the island's most important red variety. It produces deeply colored wines with plum and chocolate character.

34. A. Chianti Classico grape - Sangiovese is the primary grape in Chianti Classico, comprising minimum 80% of the blend. The variety expresses Tuscany's terroir with cherry fruit and firm tannins.

35. C. Willamette Valley grape - Pinot Noir defines Oregon's Willamette Valley, where cool climate conditions produce elegant, Burgundian-style wines that have achieved international recognition.

36. D. Xinomavro country - Greece claims Xinomavro as its noblest red variety, producing age-worthy wines in Naoussa and Amyndeon often compared to Nebbiolo for structure and complexity.

37. A. Côte-Rôtie co-ferment - Viognier may be co-fermented with Syrah in Côte-Rôtie (up to 20%), stabilizing color and adding aromatic complexity without diluting red wine character.

38. B. Blaufränkisch Hungarian name - Kékfrankos is Blaufränkisch's name in Hungary, where it produces spicy, medium-bodied reds. The same grape is called Lemberger in Germany.

39. D. Merlot body style - Merlot typically produces medium to full-bodied wines with soft tannins and plush fruit character. This approachability made it globally popular before the "Sideways effect."

40. C. Sassicaia grape - Cabernet Sauvignon is the primary grape in Sassicaia, the groundbreaking Super Tuscan that demonstrated Bordeaux varieties could thrive in Italian terroir.

41. B. Graciano region - Rioja uses Graciano as a blending component, where it adds acidity, aromatics, and aging potential to Tempranillo-based wines, though plantings remain limited.

42. A. Tavel rosé grape - Grenache dominates Tavel rosé production in the Southern Rhône, producing France's most famous dry rosé with structure and depth beyond typical pink wines.

43. D. Baga region - Bairrada in Portugal features Baga as its signature variety, producing tannic, age-worthy reds that have gained appreciation as winemaking techniques improve.

44. C. Nebbiolo characteristics - Nebbiolo combines high tannins and high acidity with surprisingly pale color. This paradox—powerful structure with delicate appearance—distinguishes the variety.

45. B. California most planted red - Cabernet Sauvignon is California's most planted red variety, dominating Napa Valley and producing the state's most prestigious and expensive wines.

46. A. Cinsault absence - Barolo does not include Cinsault, requiring 100% Nebbiolo. Cinsault appears in Southern Rhône blends, South African wines, and Languedoc productions.

47. C. Montepulciano character - Montepulciano produces deeply colored wines with bitter cherry character, particularly in Abruzzo. Despite the name similarity, it's unrelated to Vino Nobile di Montepulciano.

48. D. Mencía region - Bierzo in northwestern Spain has gained recognition for Mencía, producing fragrant, medium-bodied reds with mineral character from slate soils.

49. B. Médoc grape - Cabernet Sauvignon dominates the Médoc, where well-drained gravel soils suit the late-ripening variety. It forms the backbone of Left Bank classified growths.

50. A. Tar and roses variety - Nebbiolo is famous for its tar and roses aromatic profile, a distinctive combination that appears as wines develop in bottle. These aromas define great Barolo and Barbaresco.

51. D. Carignan Spanish name - Cariñena is Carignan's name in Spain, also lending its name to a DO region in Aragón. The variety produces deeply colored, tannic wines.

52. C. Right Bank grape - Merlot dominates Bordeaux's Right Bank appellations, including Saint-Émilion and Pomerol, where clay and limestone soils favor this earlier-ripening variety over Cabernet Sauvignon.

53. B. Zweigelt country - Austria grows more Zweigelt than any other red variety, a 1922 crossing of Blaufränkisch and St. Laurent that produces approachable, cherry-fruited wines.

54. A. Valpolicella grape - Corvina is the primary variety in Valpolicella wines, contributing the cherry fruit and structure that define both simple Valpolicella and rich Amarone.

55. D. Priorat grape - Garnacha (Grenache) is most associated with Priorat, where old bush vines on steep llicorella slate slopes produce intensely concentrated wines of international acclaim.

56. C. Sagrantino region - Umbria is home to Sagrantino, particularly the Montefalco DOCG. This variety produces some of Italy's most tannic wines, requiring extended aging.

57. B. Carbonic maceration grape - Gamay is the variety used for Beaujolais production, where carbonic maceration produces light, fruity wines with distinctive banana and bubblegum notes in Nouveau versions.

58. A. Tempranillo Portuguese name - Aragonez (or Tinta Roriz) is Tempranillo's name in Portugal, where it contributes to both Port blends and Alentejo table wines.

59. C. Plavac Mali origin - Croatia claims Plavac Mali as an indigenous variety, producing powerful wines on the Dalmatian coast. DNA research revealed it's an offspring of Zinfandel's ancestor.

60. D. Bordeaux permitted grape - Malbec is one of six red varieties permitted in Bordeaux blends, alongside Cabernet Sauvignon, Merlot, Cabernet Franc, Petit Verdot, and Carmenère.

61. B. Dolcetto region - Piedmont produces Dolcetto, an early-ripening variety yielding soft, fruity wines for everyday drinking. The name means "little sweet one," though wines are dry.

62. A. Tempranillo meaning - Tempranillo derives from "temprano," meaning "early" in Spanish, referring to the variety's relatively early ripening compared to other Spanish grapes.

63. C. Côtes du Rhône grape - Grenache dominates Côtes du Rhône red blends, providing the warm, fruity base that defines these accessible Southern Rhône wines.

64. D. Petite Sirah identity - Durif is the true identity of most California Petite Sirah, a 19th-century French crossing of Syrah and Peloursin that produces deeply colored, tannic wines.

65. B. Martinborough grape - Pinot Noir is Martinborough's signature variety, pioneering New Zealand's quality potential for this demanding grape before Central Otago's emergence.

66. A. Kadarka wine - Egri Bikavér (Bull's Blood) traditionally featured Kadarka prominently, though modern blends often emphasize Kékfrankos. Kadarka adds aromatic complexity and spice.

67. D. Barbera character - Barbera is characterized by high acidity with low tannins, creating wines with bright fruit and refreshing structure. This profile makes it extremely food-friendly.

68. C. Bandol grape - Mourvèdre dominates Bandol reds in Provence, where the variety achieves its finest French expression. Wines must contain minimum 50% Mourvèdre.

69. A. Trollinger identity - Schiava is called Trollinger in Germany, particularly Württemberg. This light red variety is also important in Alto Adige under its Italian name.

70. B. Cahors grape - Malbec (called Cot locally) dominates Cahors in Southwest France, producing the "black wines" historically famous before Argentine Malbec's rise to prominence.

71. D. St. Laurent country - Austria is most associated with St. Laurent, a Pinot-related variety producing fragrant, medium-bodied reds. It also appears in Germany and the Czech Republic.

72. C. Pinot family relationship - Pinot Noir, Pinot Gris, and Pinot Blanc are color mutations of the same variety, sharing identical DNA but differing in skin pigmentation.

73. A. 1855 Classification grape - Cabernet Sauvignon dominated the estates classified in 1855, as the Médoc's gravel soils particularly suit this variety. The classification covered Left Bank communes.

74. B. Tinta Roriz identity - Tempranillo is called Tinta Roriz in the Douro region of Portugal, where it contributes to both Port and increasingly recognized table wines.

75. D. Light Piedmont grape - Dolcetto produces light, early-drinking wines with characteristic almond notes on the finish. The variety provides everyday wine in Piedmont alongside age-worthy Nebbiolo.

76. C. Garnacha Tintorera distinction - Garnacha Tintorera (Alicante Bouschet) is a teinturier grape with red-pigmented flesh, unlike most red varieties that have clear juice. This produces deeply colored wines.

77. A. South Africa signature grape - Pinotage is South Africa's signature red variety, created there in 1925 and found almost nowhere else. It produces distinctive wines that divide opinion internationally.

78. B. Washington State grape - Merlot achieved early success in Washington State before Cabernet Sauvignon gained ground. The variety thrives in the warm days and cool nights of Columbia Valley.

79. C. Frappato origin - Sicily is home to Frappato, a light, aromatic red variety often

blended with Nero d'Avola in Cerasuolo di Vittoria DOCG. It produces fresh, cherry-scented wines.

80. D. Southern Rhône grape - Grenache dominates the Southern Rhône Valley, where it thrives in hot, dry conditions. The variety provides the generous fruit core of most regional blends.

81. A. Spätburgunder identity - Pinot Noir is called Spätburgunder in Germany, where it has become the most planted red variety, particularly in regions like Baden and Pfalz.

82. B. Nerello Mascalese region - Mount Etna in Sicily features Nerello Mascalese, producing elegant reds often compared to Burgundy. Volcanic soils contribute distinctive mineral character.

83. C. Colchagua Valley grape - Carmenère thrives in Chile's Colchagua Valley, achieving full ripeness that avoids the green character of underripe examples. The region has become synonymous with this variety.

84. D. Touriga Franca wine style - Port production features Touriga Franca prominently, where it provides aromatic complexity and approachability alongside more structured Touriga Nacional.

85. A. Syrah versus Shiraz style - Syrah typically indicates cooler-climate, more elegant wines with pepper and herb notes, while Shiraz suggests warmer-climate, riper, more fruit-forward styles.

86. B. Languedoc most planted - Carignan is heavily planted in Languedoc, where old vines produce concentrated wines increasingly valued. Much was previously used for undistinguished bulk production.

87. C. Lagrein region - Alto Adige (Südtirol) is home to Lagrein, producing deeply colored, structured reds quite different from the region's Germanic white wine focus.

88. D. Port base wine grape - Touriga Nacional is considered the finest grape for Port production, contributing color, structure, and aromatic complexity. Field blends traditionally included many varieties.

89. A. Loire Cabernet Franc character - Loire Valley Cabernet Franc is typically herbaceous and lighter-bodied with graphite notes, reflecting cool climate conditions in Chinon, Bourgueil, and Saumur-Champigny.

90. B. Bonarda country - Argentina plants extensive Bonarda (actually Douce Noir from Savoie), traditionally for everyday wines. Quality-focused producers have demonstrated its potential for more serious expressions.

91. D. Petit Verdot Bordeaux role - Petit Verdot adds color and tannic structure to Bordeaux blends in small percentages. Late ripening limits its use in cooler vintages.

92. C. Negroamaro region - Puglia in southern Italy grows Negroamaro, particularly on the Salento peninsula. The variety produces dark, robust wines with bitter cherry and earthy character.

93. A. Clare Valley red grape - Shiraz joins Riesling as Clare Valley's most important variety, producing structured, age-worthy reds quite different from warmer Barossa Valley expressions.

94. B. Teroldego region - Trentino is home to Teroldego, particularly the Teroldego Rotaliano DOC. The variety produces deeply colored wines with berry fruit and chocolate notes.

95. D. Pinot Noir climate preference - Pinot Noir performs best in cool climates where its thin skins can ripen slowly, developing complex aromatics while retaining acidity. Heat produces jammy, simple wines.

96. C. Mavrud origin - Bulgaria claims Mavrud as an indigenous variety, producing powerful, tannic reds from the Thracian Valley. The variety ranks among Bulgaria's most distinctive grapes.

97. A. Vino Nobile grape - Sangiovese (locally called Prugnolo Gentile) is the primary grape in Vino Nobile di Montepulciano. The wine's name refers to the town, not the Montepulciano grape variety.

98. B. Counoise appellation - Châteauneuf-du-Pape permits Counoise among its thirteen authorized varieties. The grape contributes freshness and spice to blends in small proportions.

99. C. Pinot Noir aromatics - Pinot Noir's thin skins and moderate tannins contribute to its characteristic aromatic profile of red fruit, earth, and delicate florals. Thick skins would produce different character.

100. D. King of Piedmont grapes - Nebbiolo is called the "King of Grapes" in Piedmont, producing the region's most prestigious wines in Barolo and Barbaresco. The variety's name derives from "nebbia" (fog).

Practice Exam 4: Viticulture

1. What is the term for the point where the scion meets the rootstock on a grafted vine?

A. Crown

B. Graft union

C. Node

D. Internode

2. Which pest devastated European vineyards in the late 19th century?

A. Powdery mildew

B. Downy mildew

C. European grapevine moth

D. Phylloxera

3. What is the term for the period when grapes change color during ripening?

A. Véraison

B. Bud break

C. Fruit set

D. Flowering

4. Which climate classification system measures heat accumulation in growing degree days?

A. Köppen system

B. Bordeaux classification

C. Winkler scale

D. Smart-Dyson index

5. What is the primary function of a vine's root system?

A. Photosynthesis

B. Water and nutrient uptake

C. Sugar production

D. Hormone regulation

6. Which training system positions shoots vertically between parallel catch wires?

A. Vertical Shoot Positioning (VSP)

B. Gobelet

C. Pergola

D. Geneva Double Curtain

7. What is the term for removing excess grape clusters to improve quality?

A. Canopy management

B. Leaf pulling

C. Suckering

D. Green harvesting

8. Which fungal disease thrives in warm, humid conditions and appears as white powdery growth?

A. Downy mildew

B. Botrytis

C. Powdery mildew (Oidium)

D. Eutypa dieback

9. What is the optimal latitude range for most quality wine production?

A. 30-50 degrees north and south

B. 0-20 degrees north and south

C. 50-60 degrees north and south

D. 20-30 degrees north and south

10. Which soil type is particularly associated with the great wines of the Médoc?

A. Limestone

B. Gravel

C. Slate

D. Volcanic ash

11. What is the term for a vine's annual growth cycle beginning in spring?

A. Dormancy

B. Senescence

C. Maturation

D. Vegetative cycle

12. Which rootstock characteristic is most important in limestone-rich soils?

A. Drought resistance

B. Nematode resistance

C. Tolerance to high pH/lime

D. Vigor control

13. What process converts sunlight into sugar in grapevine leaves?

A. Photosynthesis

B. Respiration

C. Transpiration

D. Fermentation

14. Which viticultural practice involves removing leaves around grape clusters?

A. Hedging

B. Leaf pulling (defoliation)

C. Shoot thinning

D. Desuckering

15. What is the term for the distance between vine rows?

A. Vine spacing

B. Plant density

C. Trellis height

D. Row spacing

16. Which element is essential for chlorophyll production in grapevines?

A. Phosphorus

B. Potassium

C. Nitrogen

D. Calcium

17. What is the traditional bush vine training system called in France?

A. Guyot

B. Gobelet

C. Cordon de Royat

D. Lyre

18. Which irrigation method delivers water directly to the vine's root zone?

A. Drip irrigation

B. Flood irrigation

C. Sprinkler irrigation

D. Furrow irrigation

19. What is the term for the complete failure of flowers to develop into berries?

A. Millerandage

B. Shot berries

C. Shatter

D. Coulure

20. Which disease causes "bunch rot" and requires humidity to spread?

A. Powdery mildew

B. Eutypa dieback

C. Botrytis cinerea

D. Phomopsis

21. What is the primary purpose of grafting vines onto rootstocks?

A. Phylloxera resistance

B. Increased yields

C. Earlier ripening

D. Better color extraction

22. Which soil type is famous in the Mosel region of Germany?

A. Granite

B. Slate

C. Clay

D. Sand

23. What term describes the total environment affecting vine growth including soil, climate, and topography?

A. Microclimate

B. Mesoclimate

C. Terroir

D. Macroclimate

24. Which pruning method leaves a single long cane and replacement spur?

A. Cordon training

B. Bush vine pruning

C. Spur pruning

D. Guyot pruning

25. What is the term for the green, unripe stage of grape development?

A. Herbaceous phase

B. Véraison

C. Engustment

D. Maturation

26. Which factor most directly affects the rate of photosynthesis in grapevines?

A. Soil pH

B. Sunlight intensity

C. Rootstock selection

D. Pruning method

27. What is the purpose of cover crops between vine rows?

A. Increase vine vigor

B. Attract pests

C. Prevent erosion and manage vigor

D. Increase irrigation needs

28. Which vine pest feeds on roots in its soil-dwelling form?

A. European grapevine moth

B. Spider mites

C. Leafhoppers

D. Phylloxera

29. What is the term for training vines along horizontal wires?

A. Cordon training

B. Head training

C. Bush training

D. Free-standing training

30. Which climate type is characterized by warm, dry summers and mild, wet winters?

A. Continental

B. Mediterranean

C. Maritime

D. Tropical

31. What is the term for the number of vines planted per hectare?

A. Yield ratio

B. Canopy density

C. Row spacing

D. Vine density

32. Which soil characteristic most affects water retention?

A. Color

B. Temperature

C. Texture (particle size)

D. Depth

33. What is the term for the removal of shoots growing from the trunk?

A. Desuckering

B. Hedging

C. Topping

D. Shoot positioning

34. Which mineral deficiency causes yellowing between leaf veins (interveinal chlorosis)?

A. Nitrogen

B. Iron or magnesium

C. Phosphorus

D. Potassium

35. What is the typical lifespan of a commercial grapevine?

A. 5-10 years

B. 10-15 years

C. 15-25 years

D. 30-50 years or more

36. Which fungal disease appears as yellow, oily spots on leaf surfaces?

A. Powdery mildew

B. Anthracnose

C. Downy mildew

D. Black rot

37. What is the primary benefit of high-altitude viticulture?

A. Greater diurnal temperature variation

B. Higher rainfall

C. Warmer nights

D. Reduced sunlight

38. Which practice involves removing the tips of growing shoots?

A. Leaf pulling

B. Topping or hedging

C. Desuckering

D. Cluster thinning

39. What is the term for a single variety planted from one original mother vine?

A. Cultivar

B. Hybrid

C. Rootstock

D. Clone

40. Which factor determines the latest date grapes can be harvested before frost damage?

A. Soil type

B. Vine age

C. Latitude

D. Growing season length

41. What is the primary purpose of shoot positioning in canopy management?

A. Optimize sun exposure and air circulation

B. Increase yield

C. Reduce labor costs

D. Prevent frost damage

42. Which soil type promotes vigorous vine growth due to high water retention?

A. Gravel

B. Clay

C. Sand

D. Chalk

43. What is the term for incomplete fertilization resulting in seedless, small berries?

A. Coulure

B. Shatter

C. Chlorosis

D. Millerandage

44. Which organism forms beneficial relationships with vine roots to enhance nutrient uptake?

A. Phylloxera

B. Nematodes

C. Mycorrhizal fungi

D. Botrytis

45. What is the main disadvantage of drip irrigation?

A. High installation and maintenance costs

B. Water waste

C. Uneven distribution

D. Soil erosion

46. Which training system is traditional in the Vinho Verde region of Portugal?

A. VSP

B. Pergola (overhead)

C. Gobelet

D. Guyot

47. What is the term for the weight of grapes produced per vine or hectare?

A. Density

B. Brix

C. Must weight

D. Yield

48. Which environmental factor most influences the style of wine produced in a region?

A. Soil color

B. Vine age

C. Climate

D. Rootstock

49. What is the purpose of planting vines on slopes?

A. Improved drainage and sun exposure

B. Easier mechanical harvesting

C. Higher yields

D. Wind protection

50. Which viticultural term describes the aspect or direction a vineyard slope faces?

A. Gradient

B. Exposure (aspect)

C. Elevation

D. Inclination

51. What is the primary function of tendrils on a grapevine?

A. Water absorption

B. Photosynthesis

C. Support and climbing

D. Nutrient storage

52. Which pest causes "fanleaf" disease in grapevines?

A. Phylloxera

B. Leafhoppers

C. Spider mites

D. Nematodes (transmitting virus)

53. What is the term for the practice of limiting water to stress vines and improve grape quality?

A. Deficit irrigation

B. Flood irrigation

C. Drip irrigation

D. Furrow irrigation

54. Which soil component provides the best drainage?

A. Clay

B. Sand and gravel

C. Silt

D. Loam

55. What is the main advantage of spur pruning over cane pruning?

A. Higher yields

B. Better fruit quality

C. Simpler and more consistent

D. Earlier ripening

56. Which climate hazard can destroy an entire vintage in spring?

A. Drought

B. Hail

C. Heat waves

D. Frost

57. What is the term for the science of grapevine cultivation?

A. Viticulture

B. Enology

C. Ampelography

D. Pomology

58. Which rootstock characteristic is most important in drought-prone regions?

A. Lime tolerance

B. Deep rooting and drought resistance

C. High vigor

D. Nematode resistance

59. What is the purpose of reflective mulches in cool-climate vineyards?

A. Reduce erosion

B. Conserve water

C. Prevent weeds

D. Increase light reflection and heat

60. Which training system divides the canopy into two curtains for increased sun exposure?

A. VSP

B. Gobelet

C. Geneva Double Curtain or Lyre

D. Pergola

61. What is the term for the annual shedding of leaves in autumn?

A. Senescence

B. Dormancy

C. Véraison

D. Bud break

62. Which soil type is associated with the steep vineyards of the Northern Rhône?

A. Limestone

B. Granite

C. Clay

D. Volcanic ash

63. What is the typical sugar accumulation pattern during grape ripening?

A. Decreases steadily

B. Remains constant

C. Increases steadily

D. Fluctuates randomly

64. Which viticultural practice is used to combat spring frost?

A. Leaf pulling

B. Green harvesting

C. Canopy reduction

D. Wind machines or smudge pots

65. What is the primary purpose of leaving a replacement spur during pruning?

A. Provide next year's fruiting cane

B. Increase current yield

C. Support the trellis

D. Attract beneficial insects

66. Which factor most influences the decision of when to harvest?

A. Moon phase

B. Sugar, acid, and phenolic ripeness

C. Vine age

D. Soil moisture

67. What is the term for the study and identification of grape varieties?

A. Viticulture

B. Enology

C. Vinification

D. Ampelography

68. Which canopy management technique increases air circulation to prevent disease?

A. Dense planting

B. Overhead irrigation

C. Leaf removal

D. Heavy fertilization

69. What is the primary benefit of old vines (vieilles vignes)?

A. Lower yields with more concentrated fruit

B. Higher yields

C. Disease resistance

D. Earlier ripening

70. Which component of soil provides essential nutrients for vine growth?

A. Sand

B. Organic matter

C. Gravel

D. Rock fragments

71. What is the term for the failure of flowers to set fruit due to poor weather during bloom?

A. Millerandage

B. Shatter

C. Coulure

D. Chlorosis

72. Which irrigation scheduling method uses soil moisture sensors?

A. Calendar-based

B. Visual assessment

C. Weather-based

D. Precision irrigation

73. What is the primary purpose of rootstock selection?

A. Match soil conditions and provide pest resistance

B. Determine grape variety

C. Control wine style

D. Influence fermentation

74. Which training system is most common in Burgundy?

A. Pergola

B. Guyot

C. Gobelet

D. Geneva Double Curtain

75. What is the term for the band of latitudes where most vineyards are located?

A. Equatorial zone

B. Polar zone

C. Wine belt

D. Tropical zone

76. Which soil characteristic affects root penetration and vine vigor?

A. Color

B. Surface temperature

C. Mineral content

D. Depth and structure

77. What is the term for a vineyard planted with multiple grape varieties mixed together?

A. Field blend

B. Cuvée

C. Assemblage

D. Varietal

78. Which weather condition during flowering most negatively impacts fruit set?

A. Warm, dry weather

B. Cold, wet, or windy weather

C. Mild temperatures

D. High humidity only

79. What is the primary function of the grapevine's cambium layer?

A. Water storage

B. Photosynthesis

C. Sugar transport

D. Producing new vascular tissue (growth)

80. Which method of propagation creates genetically identical vines?

A. Sexual reproduction (seeds)

B. Cross-pollination

C. Clonal propagation (cuttings)

D. Hybridization

81. What is the term for the water stress that can improve grape quality when moderate?

A. Controlled deficit

B. Waterlogging

C. Saturation

D. Flooding

82. Which soil type is prized in Châteauneuf-du-Pape for heat retention?

A. Chalk

B. Galets (large stones)

C. Clay

D. Sand

83. What is the purpose of hilling up soil around the graft union in cold climates?

A. Improve drainage

B. Increase fertility

C. Support the trunk

D. Winter protection

84. Which organism is the primary vector for Pierce's disease in grapevines?

A. Nematodes

B. Aphids

C. Sharpshooter leafhoppers

D. Spider mites

85. What is the term for the complete annual cycle of vine growth from bud break to dormancy?

A. Phenological cycle

B. Harvest season

C. Vintage year

D. Growing period

86. Which pruning approach is best suited for vigorous vines?

A. Minimal pruning

B. Leaving more buds to spread vigor

C. Short spur pruning

D. No pruning

87. What is the primary concern with excessive nitrogen fertilization?

A. Reduced yields

B. Earlier ripening

C. Excessive vigor and delayed ripening

D. Improved fruit quality

88. Which viticultural region pioneered the use of Integrated Pest Management (IPM)?

A. Bordeaux

B. Burgundy

C. Napa Valley

D. Various regions simultaneously

89. What is the term for vines grown without trellis support?

A. Free-standing or bush vines

B. Cordon trained

C. Cane pruned

D. VSP trained

90. Which factor most influences the potential alcohol level of wine?

A. Vine age

B. Sugar content at harvest

C. Soil type

D. Training system

91. What is the purpose of scoring or girdling vines?

A. Reduce vigor

B. Prevent disease

C. Improve drainage

D. Interrupt nutrient flow to increase fruit ripeness

92. Which climate feature helps preserve acidity in grapes?

A. Hot nights

B. Consistent temperatures

C. Cool nights

D. High humidity

93. What is the main advantage of high-density planting?

A. Competition reduces vigor and improves quality

B. Higher yields per vine

C. Easier mechanical harvesting

D. Lower establishment costs

94. Which soil characteristic is measured by the term pH?

A. Texture

B. Acidity or alkalinity

C. Water retention

D. Nutrient content

95. What is the term for the bud that remains dormant as a backup on a vine?

A. Primary bud

B. Secondary bud

C. Latent bud

D. Tertiary bud

96. Which factor determines whether a vineyard requires irrigation?

A. Soil color

B. Vine variety

C. Row orientation

D. Rainfall versus evapotranspiration

97. What is the traditional reason for orienting vine rows north-south?

A. Equal sun exposure on both sides

B. Wind protection

C. Easier harvesting

D. Disease prevention

98. Which rootstock series was developed specifically for phylloxera resistance?

A. Chardonnay clones

B. American Vitis species hybrids

C. European vinifera selections

D. Asian grape varieties

99. What is the purpose of planting roses at the end of vine rows?

A. Aesthetic appeal

B. Attract pollinators

C. Early warning system for powdery mildew

D. Repel pests

100. Which factor has the greatest impact on vintage variation?

A. Soil composition

B. Rootstock selection

C. Vine age

D. Weather conditions during the growing season

Answer Explanations

1. B. Graft union definition - The graft union is the point where the scion (fruiting variety) joins the rootstock. This junction is visible as a slight bulge on the lower trunk and represents a critical point for vine health and stability.

2. D. 19th century vineyard pest - Phylloxera, a root-feeding aphid native to North America, devastated European vineyards beginning in the 1860s. The solution—grafting European vines onto resistant American rootstocks—remains standard practice today.

3. A. Color change term - Véraison marks the onset of ripening when grapes change color, soften, and begin accumulating sugar. Red varieties turn from green to purple while white varieties become translucent and golden.

4. C. Heat accumulation system - The Winkler scale measures growing degree days above 50°F (10°C) during the growing season, classifying regions from cool Region I to hot Region V for variety selection guidance.

5. B. Root function - The root system absorbs water and dissolved nutrients from soil, delivering them through the vascular system to support vine growth, photosynthesis, and fruit development.

6. A. Vertical training system - Vertical Shoot Positioning (VSP) trains shoots upward between parallel catch wires, creating an organized canopy with good sun exposure and air circulation for fruit and foliage.

7. D. Cluster removal term - Green harvesting (vendange verte) removes excess grape clusters during summer to concentrate the vine's resources into remaining fruit, improving quality at the expense of quantity.

8. C. Powdery growth disease - Powdery mildew (Oidium) appears as white, powdery fungal growth on leaves, shoots, and berries. Unlike downy mildew, it thrives in warm, dry conditions with moderate humidity.

9. A. Wine latitude range - Most quality wine production occurs between 30-50 degrees latitude in both hemispheres, where temperature ranges allow proper grape ripening while preserving acidity.

10. B. Médoc soil type - Gravel soils define the Médoc's greatest terroirs, providing excellent drainage, heat retention, and stress that produces concentrated Cabernet Sauvignon-based wines.

11. D. Annual growth cycle - The vegetative cycle encompasses all growth phases from spring bud break through harvest to autumn leaf fall and winter dormancy, repeating annually throughout the vine's life.

12. C. Limestone rootstock need - High pH tolerance (lime resistance) is essential for rootstocks in limestone-rich soils. Susceptible rootstocks develop lime-induced chlorosis, blocking iron uptake and weakening vines.

13. A. Sugar production process - Photosynthesis converts sunlight, water, and carbon dioxide into glucose in leaf cells. This sugar accumulates in grapes during ripening and becomes alcohol during fermentation.

14. B. Leaf removal practice - Leaf pulling (defoliation or effeuillage) removes leaves around grape clusters to improve sun exposure, air circulation, and spray penetration, reducing disease pressure and enhancing ripeness.

15. D. Between-row distance - Row spacing refers to the distance between vine rows, affecting mechanization options, sunlight interception, and overall vineyard density. This differs from vine spacing within rows.

16. C. Chlorophyll element - Nitrogen is essential for chlorophyll production, the green pigment enabling photosynthesis. Nitrogen deficiency causes pale leaves and weak growth, while excess promotes excessive vegetation.

17. B. French bush vine system - Gobelet (meaning "goblet" or "cup") is the traditional French term for bush vine training, where vines are self-supporting with short spurs arranged around a central head.

18. A. Precise water delivery - Drip irrigation delivers water directly to the root zone through emitters along tubes, minimizing waste and allowing precise control of vine water status for quality optimization.

19. D. Flower failure term - Coulure describes the failure of flowers to develop into berries, typically caused by poor weather during flowering. Affected clusters show sparse berry set and reduced yields.

20. C. Bunch rot disease - Botrytis cinerea causes bunch rot in humid conditions, spreading rapidly through tight clusters. While destructive as gray rot, controlled infection produces beneficial noble rot for sweet wines.

21. A. Grafting purpose - Phylloxera resistance is the primary reason for grafting, as European Vitis vinifera roots are susceptible to this pest. American rootstocks provide resistance while supporting quality vinifera fruit.

22. B. Mosel soil - Slate (Schiefer) defines the Mosel's steep vineyard slopes, retaining heat during the day and radiating it at night to aid ripening in this cool northern region.

23. C. Complete environment term - Terroir encompasses all environmental factors affecting vine growth and wine character, including soil, climate, topography, and human influences unique to each site.

24. D. Cane and spur pruning - Guyot pruning leaves one or two long canes (bearing fruit) and

a short replacement spur (providing next year's cane). Single Guyot uses one cane; double Guyot uses two.

25. A. Unripe stage - The herbaceous phase precedes véraison when grapes are green, hard, and highly acidic. During this stage, berries grow rapidly but contain minimal sugar and harsh green flavors.

26. B. Photosynthesis factor - Sunlight intensity most directly affects photosynthesis rate, determining how much sugar vines produce. Adequate light exposure throughout the canopy maximizes photosynthetic capacity.

27. C. Cover crop purpose - Cover crops between rows prevent erosion, compete with vines for water and nutrients (managing vigor), improve soil structure, and provide habitat for beneficial insects.

28. D. Root-feeding pest - Phylloxera feeds on vine roots in its soil-dwelling form, causing galls that impair root function and eventually kill susceptible vinifera vines. American species tolerate this feeding.

29. A. Horizontal wire training - Cordon training establishes permanent horizontal arms (cordons) along wires, from which fruiting spurs emerge annually. This system suits spur-pruned varieties and mechanical management.

30. B. Dry summer climate - Mediterranean climate features warm, dry summers and mild, wet winters, ideal for grape growing. Regions like Napa, the Rhône, and much of Spain share this pattern.

31. D. Planting density term - Vine density measures vines per hectare, ranging from 2,000-3,000 in warm, fertile regions to 10,000+ in Burgundy. Higher density increases competition and typically improves quality.

32. C. Water retention factor - Soil texture (particle size distribution among sand, silt, and clay) most affects water retention. Clay holds water tightly; sand drains freely; loam offers intermediate characteristics.

33. A. Trunk shoot removal - Desuckering removes unwanted shoots (water sprouts) growing from the trunk or below the graft union, directing vine energy toward productive growth and preventing rootstock dominance.

34. B. Chlorosis cause - Iron or magnesium deficiency causes interveinal chlorosis, where leaves yellow between veins while veins remain green. Lime-induced chlorosis blocks iron availability in high-pH soils.

35. D. Vine lifespan - Commercial grapevines commonly produce quality fruit for 30-50 years or more. Old vines (50-100+ years) often produce smaller yields of highly concentrated, valued fruit.

36. C. Yellow spot disease - Downy mildew (Peronospora) creates yellow, oily spots on leaf upper surfaces with corresponding white fungal

growth underneath. This disease requires moisture to spread.

37. A. High altitude benefit - Greater diurnal temperature variation (warm days, cool nights) characterizes high-altitude viticulture, promoting sugar accumulation during warm days while preserving acidity during cool nights.

38. B. Shoot tip removal - Topping or hedging removes growing shoot tips, controlling canopy size and redirecting vine energy toward fruit ripening rather than continued vegetative growth.

39. D. Single vine selection - A clone is a group of vines propagated vegetatively from a single mother vine, sharing identical genetic makeup. Different clones of one variety may show distinct characteristics.

40. C. Frost timing factor - Growing season length determines how late harvest can occur before damaging frost arrives. Regions with short seasons require early-ripening varieties to achieve maturity safely.

41. A. Shoot positioning purpose - Shoot positioning optimizes sun exposure on leaves and fruit while improving air circulation through the canopy. This enhances photosynthesis, ripening, and disease prevention.

42. B. High water retention soil - Clay's fine particles retain water tightly, supporting vigorous vine growth but potentially causing excessive vigor and delayed ripening without careful management.

43. D. Incomplete fertilization - Millerandage results when some flowers are incompletely fertilized, producing clusters with normal berries alongside small, seedless "shot berries" that may contribute concentration.

44. C. Beneficial root organism - Mycorrhizal fungi form symbiotic relationships with vine roots, extending the root system's reach and enhancing water and nutrient uptake, particularly phosphorus.

45. A. Drip irrigation disadvantage - High installation and maintenance costs represent drip irrigation's main disadvantage. Emitters require monitoring for clogging, and systems need regular maintenance.

46. B. Vinho Verde training - Pergola (overhead) training traditionally allowed vines to climb high in the humid Vinho Verde region, maximizing air circulation and enabling other crops below.

47. D. Production measure - Yield measures grape production, typically expressed as tons per acre or hectoliters per hectare. Regulations often limit yields for quality appellations.

48. C. Wine style factor - Climate most influences wine style, determining ripeness levels, acidity balance, and which varieties can successfully mature. All other factors operate within climatic constraints.

49. A. Slope benefits - Slopes improve drainage, preventing waterlogging, while angled surfaces

capture more direct sunlight in cool regions. Cold air also drains downhill, reducing frost risk.

50. B. Direction term - Exposure (or aspect) describes the compass direction a slope faces. South-facing slopes in the Northern Hemisphere receive more direct sunlight, affecting vine growth and ripening.

51. C. Tendril function - Tendrils enable grapevines to climb by wrapping around supports. These modified stems are essential for the vine's natural climbing habit, though modern trellising often provides alternative support.

52. D. Fanleaf vector - Nematodes transmit fanleaf virus by feeding on infected roots then moving to healthy vines. This viral disease causes leaf deformation, reduced yields, and shortened vine life.

53. A. Water restriction practice - Deficit irrigation intentionally restricts water to stress vines, reducing vigor and berry size while concentrating flavors. Careful management prevents harmful drought stress.

54. B. Best drainage component - Sand and gravel provide the best drainage due to large particle size and air spaces. This characteristic is valued in regions like the Médoc and Graves.

55. C. Spur pruning advantage - Spur pruning is simpler and more consistent than cane pruning, facilitating mechanical pre-pruning and requiring less skilled labor to complete accurately.

56. D. Spring hazard - Frost can destroy an entire vintage by killing emerging shoots and flower clusters in spring. Late frosts after bud break cause the most devastating damage.

57. A. Grape growing science - Viticulture is the science and practice of grape cultivation, encompassing all aspects from planting through harvest. Enology covers winemaking after grapes are harvested.

58. B. Drought rootstock need - Deep rooting habit and drought resistance are essential rootstock characteristics in dry regions, enabling vines to access deep soil moisture during rainless summer months.

59. D. Reflective mulch purpose - Reflective mulches increase light reflection onto the canopy from below, enhancing photosynthesis and heat accumulation in cool climates where sunlight is limited.

60. C. Split canopy systems - Geneva Double Curtain and Lyre training divide canopies into two separate curtains, doubling exposed leaf surface and allowing more light penetration for vigorous vines.

61. A. Leaf shedding term - Senescence describes the natural aging and death of leaves in autumn, when nutrients are withdrawn to permanent vine structures before leaves fall and dormancy begins.

62. B. Northern Rhône soil - Granite soils characterize the steep terraced vineyards of the

Northern Rhône, particularly Côte-Rôtie and Hermitage, contributing mineral character to Syrah wines.

63. C. Sugar pattern - Sugar concentration increases steadily during ripening as photosynthesis continues and berries soften. This accumulation determines potential alcohol and signals harvest timing.

64. D. Frost protection methods - Wind machines mix cold ground-level air with warmer air above, while smudge pots and heaters raise air temperature. Both methods protect against radiation frost.

65. A. Replacement spur purpose - The replacement spur provides shoots that become next year's fruiting cane in Guyot pruning. This maintains the fruiting zone close to the vine's head.

66. B. Harvest decision factors - Sugar (Brix), acidity, and phenolic (tannin and color) ripeness together determine harvest timing. Balancing these factors produces wines with optimal flavor and structure.

67. D. Variety identification science - Ampelography is the study of grape variety identification and classification through leaf shape, cluster characteristics, and other morphological features, now supplemented by DNA analysis.

68. C. Disease prevention technique - Leaf removal increases air circulation around clusters, reducing humidity and disease pressure from fungi like Botrytis that require moisture to infect grapes.

69. A. Old vine benefit - Old vines naturally produce lower yields with smaller berries, concentrating flavors and complexity. Their deep root systems also access nutrients and water unavailable to young vines.

70. B. Nutrient source - Organic matter provides essential nutrients through decomposition, improves soil structure, supports beneficial organisms, and increases water retention in sandy soils.

71. C. Fruit set failure - Coulure is the failure of flowers to set fruit, typically caused by cold, wet, or windy weather during bloom. Affected clusters show missing berries where flowers failed.

72. D. Sensor-based scheduling - Precision irrigation uses soil moisture sensors, weather data, and vine stress indicators to schedule irrigation precisely, optimizing water use and vine performance.

73. A. Rootstock selection purpose - Rootstock selection matches soil conditions (drainage, pH, fertility) while providing pest resistance. Different rootstocks suit different sites and management goals.

74. B. Burgundy training - Guyot training predominates in Burgundy, with single Guyot common in the Côte d'Or. This system suits Pinot

Noir and Chardonnay while facilitating high-density planting.

75. C. Vineyard latitude band - The wine belt describes latitudes between roughly 30-50 degrees where conditions suit quality wine production. Climate change is gradually shifting these boundaries.

76. D. Root penetration factor - Soil depth and structure determine how deeply roots can penetrate, affecting vine vigor, drought resistance, and access to nutrients. Compacted or shallow soils limit root development.

77. A. Mixed planting term - Field blend describes vineyards planted with multiple varieties intermingled, traditionally harvested and fermented together. This practice predates modern single-variety viticulture.

78. B. Flowering weather impact - Cold, wet, or windy weather during flowering disrupts pollination and fertilization, causing coulure (poor fruit set) and millerandage (uneven berry development).

79. D. Cambium function - The cambium layer produces new vascular tissue (xylem and phloem) enabling the vine to grow in diameter and maintain transport systems for water, nutrients, and sugars.

80. C. Identical vine method - Clonal propagation through cuttings produces genetically identical vines, preserving desired characteristics. Sexual reproduction (seeds) creates genetic variation and unpredictable offspring.

81. A. Beneficial water stress - Controlled deficit irrigation intentionally stresses vines to reduce vigor, limit berry size, and concentrate flavors. Moderate stress improves quality; severe stress damages vines.

82. B. Heat-retaining stones - Galets (large rounded stones) cover vineyards in Châteauneuf-du-Pape, absorbing daytime heat and radiating it at night to aid ripening while improving drainage.

83. D. Hilling purpose - Hilling soil around the graft union protects this vulnerable junction from winter freeze damage in cold climates. Spring removal prevents scion rooting above the graft.

84. C. Pierce's disease vector - Sharpshooter leafhoppers, particularly the glassy-winged sharpshooter, transmit the Xylella fastidiosa bacterium causing Pierce's disease. The disease blocks water transport, killing vines.

85. A. Annual cycle term - The phenological cycle tracks all growth stages from bud break through flowering, véraison, harvest, and dormancy. Recording phenology helps predict harvest timing and track climate effects.

86. B. Vigorous vine pruning - Leaving more buds spreads vigor across more shoots, reducing excessive growth on each. This technique manages overly vigorous vines that would otherwise produce too much vegetation.

87. C. Excess nitrogen problem - Excessive nitrogen promotes vegetative vigor at the expense of fruit ripening, delays maturity, increases disease susceptibility, and can produce vegetal wine flavors.

88. D. IPM development - Integrated Pest Management developed across multiple regions simultaneously as growers sought alternatives to calendar-based chemical spraying. The approach now represents standard sustainable practice.

89. A. Unsupported vines - Free-standing or bush vines grow without trellis support, relying on sturdy trunks to remain upright. This traditional approach suits low-vigor conditions and certain training systems.

90. B. Alcohol potential factor - Sugar content at harvest directly determines potential alcohol, as yeast converts grape sugar to ethanol. Higher sugar produces higher alcohol, limited by yeast tolerance.

91. D. Girdling purpose - Scoring or girdling interrupts phloem transport, trapping sugars and growth regulators above the cut to enhance ripeness or increase berry size, depending on timing.

92. C. Acidity preservation - Cool nights preserve acidity by slowing respiration that consumes malic acid. This diurnal temperature variation is valued for producing balanced wines with fresh acidity.

93. A. High density advantage - High-density planting forces vine competition for water and nutrients, naturally reducing vigor and producing smaller berries with more concentrated flavors in quality-focused regions.

94. B. pH measurement - Soil pH measures acidity or alkalinity on a logarithmic scale. This affects nutrient availability, rootstock selection, and vine health. Most vines prefer slightly acidic to neutral soils.

95. C. Backup bud term - Latent buds remain dormant as reserves, activating if primary buds are damaged by frost or other injury. These backup buds may produce fruit but typically yield less than primary buds.

96. D. Irrigation need factor - The balance between rainfall and evapotranspiration (water loss through evaporation and vine transpiration) determines irrigation necessity. Deficit requires supplemental water.

97. A. North-south row benefit - North-south row orientation provides equal sun exposure on both sides as the sun crosses the sky, promoting even ripening. East-west rows receive uneven exposure.

98. B. Phylloxera-resistant rootstocks - American Vitis species (riparia, rupestris, berlandieri) and their hybrids provide phylloxera resistance. These native American species evolved alongside the pest.

99. C. Rose purpose - Roses at row ends traditionally served as early warning indicators for powdery mildew, as they're susceptible to similar fungal diseases and show symptoms before vines.

100. D. Vintage variation cause - Weather conditions during the growing season cause vintage variation, affecting ripening, disease pressure, and harvest timing. Soil and rootstock remain constant between vintages.

Practice Exam 5: Still Wine Production

1. What is the primary purpose of crushing grapes before fermentation?

A. Release juice and expose pulp to yeast

B. Remove stems from clusters

C. Extract tannins from seeds

D. Begin malolactic fermentation

2. Which vessel is most associated with temperature-controlled fermentation of white wines?

A. Oak barrels

B. Concrete eggs

C. Stainless steel tanks

D. Clay amphorae

3. What is the term for the solid matter (skins, seeds, pulp) in fermenting red wine?

A. Lees

B. Cap (chapeau)

C. Must

D. Pomace

4. Which process converts malic acid to lactic acid in wine?

A. Alcoholic fermentation

B. Carbonic maceration

C. Cold stabilization

D. Malolactic fermentation

5. What is the primary byproduct of alcoholic fermentation besides ethanol?

A. Carbon dioxide

B. Lactic acid

C. Acetic acid

D. Glycerol

6. Which technique involves pumping juice from the bottom of the tank over the cap?

A. Punch down (pigeage)

B. Délestage

C. Pump over (remontage)

D. Rack and return

7. What is the purpose of cold soaking (macération à froid) before fermentation?

A. Increase alcohol levels

B. Extract color and fruit character without tannins

C. Speed up fermentation

D. Reduce acidity

8. Which fining agent is derived from fish bladders?

A. Bentonite

B. Egg whites

C. Casein

D. Isinglass

9. What is the term for the contact between wine and dead yeast cells after fermentation?

A. Maceration

B. Extraction

C. Lees contact (sur lie)

D. Must enrichment

10. Which winemaking approach minimizes oxygen exposure throughout production?

A. Reductive winemaking

B. Oxidative winemaking

C. Traditional winemaking

D. Biodynamic winemaking

11. What is the purpose of bâtonnage?

A. Pressing grapes

B. Stirring lees to add texture and complexity

C. Removing sediment

D. Adding sulfur dioxide

12. Which type of press uses an inflatable bladder to gently squeeze grapes?

A. Basket press

B. Continuous press

C. Screw press

D. Membrane (bladder) press

13. What temperature range is typically used for white wine fermentation?

A. 25-30°C (77-86°F)

B. 30-35°C (86-95°F)

C. 12-18°C (54-64°F)

D. 5-10°C (41-50°F)

14. Which compound is added to must to prevent oxidation and microbial spoilage?

A. Sulfur dioxide

B. Citric acid

C. Tartaric acid

D. Nitrogen

15. What is the term for removing clear wine from sediment?

A. Fining

B. Racking

C. Filtering

D. Stabilizing

16. Which oak type imparts more pronounced vanilla and coconut flavors?

A. French oak

B. Slavonian oak

C. Hungarian oak

D. American oak

17. What is the purpose of chaptalization?

A. Increase sugar levels to raise potential alcohol

B. Reduce acidity

C. Add tannins

D. Clarify wine

18. Which winemaking technique is used to produce most rosé wines?

A. Co-fermentation with white grapes

B. Blending red and white wines

C. Limited skin contact (saignée or direct press)

D. Extended maceration

19. What is the term for the first juice to run freely from crushed grapes before pressing?

A. Press wine

B. Free-run juice

C. Must

D. Pomace extract

20. Which fermentation vessel adds no flavor to wine?

A. New oak barrels

B. Concrete tanks

C. Clay amphorae

D. Stainless steel tanks

21. What is the primary purpose of cold stabilization?

A. Kill bacteria

B. Remove proteins

C. Precipitate tartrate crystals

D. Reduce alcohol

22. Which organism is primarily responsible for alcoholic fermentation?

A. Saccharomyces cerevisiae

B. Oenococcus oeni

C. Brettanomyces

D. Acetobacter

23. What is the term for the technique of foot-treading grapes in traditional Port production?

A. Pigeage

B. Lagares

C. Remontage

D. Délestage

24. Which winemaking practice involves fermenting wine in barrel rather than tank?

A. Sur lie aging

B. Malolactic fermentation

C. Cold stabilization

D. Barrel fermentation

25. What is the purpose of adding yeast nutrients during fermentation?

A. Increase alcohol

B. Improve color

C. Prevent stuck fermentation

D. Add flavor

26. Which pressing method produces the highest quality juice?

A. Gentle, whole-cluster pressing

B. Continuous pressing

C. High-pressure extraction

D. Thermal extraction

27. What is the term for the practice of adding grape concentrate to increase sugar?

A. Chaptalization

B. Acidification

C. Saignée

D. Enrichment (or süssreserve addition)

28. Which type of closure allows minimal oxygen transmission?

A. Natural cork

B. Screwcap (Stelvin)

C. Synthetic cork

D. Glass stopper

29. What is the traditional Burgundian term for a 228-liter oak barrel?

A. Barrique

B. Pièce

C. Foudre

D. Tonneau

30. Which maceration technique involves fermenting whole berries in a carbon dioxide atmosphere?

A. Cold soaking

B. Extended maceration

C. Carbonic maceration

D. Cryoextraction

31. What is the purpose of micro-oxygenation?

A. Remove off-odors

B. Increase acidity

C. Speed clarification

D. Soften tannins and stabilize color

32. Which enzyme is added to improve juice extraction and clarification?

A. Lipase

B. Pectinase

C. Protease

D. Amylase

33. What is the term for the grape solids that settle after crushing white grapes?

A. Gross lees

B. Fine lees

C. Pomace

D. Cap

34. Which fermentation temperature range is typical for red wines?

A. 10-15°C (50-59°F)

B. 5-10°C (41-50°F)

C. 20-30°C (68-86°F)

D. 35-40°C (95-104°F)

35. What is the effect of new oak barrels on wine compared to older barrels?

A. Less oxygen exposure

B. More fruit preservation

C. Neutral flavor impact

D. More pronounced oak flavors

36. Which clarification method uses gravity to settle particles?

A. Centrifugation

B. Sedimentation (settling)

C. Cross-flow filtration

D. Fining

37. What is the primary purpose of destemming grapes?

A. Reduce harsh green tannins

B. Increase extraction

C. Speed fermentation

D. Improve color

38. Which wine style typically undergoes malolactic fermentation?

A. Aromatic white wines

B. Beaujolais Nouveau

C. Light rosé wines

D. Most red wines and full-bodied whites

39. What is the term for the addition of fresh grape juice to sweeten wine?

A. Chaptalization

B. Enrichment

C. Süssreserve (dosage)

D. Fortification

40. Which fining agent is most effective at removing excess tannins?

A. Bentonite

B. Egg whites (albumin)

C. Activated charcoal

D. Isinglass

41. What is the primary purpose of inert gas blanketing during winemaking?

A. Prevent oxidation

B. Speed fermentation

C. Clarify wine

D. Adjust acidity

42. Which winemaking vessel is experiencing renewed interest for its neutral and micro-oxygenation properties?

A. Stainless steel

B. American oak

C. French oak

D. Concrete (including eggs)

43. What is the term for wine made from frozen grapes that concentrates sugars?

A. Late harvest wine

B. Botrytized wine

C. Icewine (Eiswein)

D. Passito

44. Which component of oak contributes vanilla flavors to wine?

A. Tannins

B. Vanillin

C. Lactones

D. Furfural

45. What is the purpose of délestage (rack and return)?

A. Aerating wine and softening tannins

B. Adding sulfur dioxide

C. Cooling fermentation

D. Barrel aging

46. Which type of yeast fermentation occurs without added commercial yeast?

A. Controlled fermentation

B. Inoculated fermentation

C. Induced fermentation

D. Spontaneous (wild) fermentation

47. What is the effect of extended maceration after fermentation?

A. Reduces tannins

B. Lightens color

C. Increases tannin extraction

D. Decreases body

48. Which acid is most commonly added to wines in warm climates?

A. Citric acid

B. Tartaric acid

C. Malic acid

D. Lactic acid

49. What is the term for the traditional stone troughs used for treading grapes in the Douro?

A. Foudres

B. Barriques

C. Pièces

D. Lagares

50. Which winemaking decision most affects whether a wine is dry or sweet?

A. When fermentation is stopped

B. Oak selection

C. Pressing pressure

D. Yeast strain

51. What is the purpose of toasting oak barrels during cooperage?

A. Sterilize the wood

B. Increase barrel size

C. Develop flavor compounds

D. Reduce porosity

52. Which filtration method removes the smallest particles including yeast and bacteria?

A. Coarse filtration

B. Sterile (membrane) filtration

C. Pad filtration

D. Earth filtration

53. What is the term for wine produced from dried grapes?

A. Eiswein

B. Late harvest

C. Vin de paille

D. Passito or appassimento

54. Which factor most influences the extraction of color and tannins during red wine fermentation?

A. Temperature and time

B. Yeast selection

C. Sulfur dioxide levels

D. Oak contact

55. What is the purpose of adding cultured yeast to must?

A. Increase wild yeast activity

B. Ensure predictable, reliable fermentation

C. Add complexity

D. Prevent malolactic fermentation

56. Which winemaking approach deliberately exposes wine to oxygen?

A. Reductive winemaking

B. Protective winemaking

C. Oxidative winemaking

D. Anaerobic winemaking

57. What is the term for removing grape skins and seeds after fermentation?

A. Racking

B. Fining

C. Filtering

D. Pressing

58. Which compound gives toasted oak its characteristic smoky aroma?

A. Guaiacol

B. Vanillin

C. Eugenol

D. Lactone

59. What is the typical alcohol content produced by fermenting grapes with 25 Brix sugar?

A. 10-11%

B. 13-14%

C. 16-17%

D. 8-9%

60. Which type of vessel allows the most oxygen contact during aging?

A. Stainless steel tank

B. Glass-lined tank

C. Oak barrel

D. Concrete tank

61. What is the term for the natural settling of wine particles over time?

A. Filtration

B. Fining

C. Centrifugation

D. Sedimentation

62. Which process uses centrifugal force to separate solids from wine?

A. Centrifugation

B. Filtration

C. Fining

D. Racking

63. What is the purpose of punch downs (pigeage) during red wine fermentation?

A. Cool the must

B. Keep the cap submerged for extraction

C. Add oxygen

D. Clarify the wine

64. Which winemaking technique produces the lightest style of rosé?

A. Saignée method

B. Maceration method

C. Direct pressing

D. Blending method

65. What is the effect of longer barrel aging on wine?

A. Fresher fruit character

B. Higher acidity

C. Lighter color

D. More oxidative development and oak integration

66. Which fining agent is derived from milk protein?

A. Casein

B. Gelatin

C. Isinglass

D. Egg whites

67. What is the term for the practice of aging wine on its fine lees?

A. Maceration

B. Sur lie

C. Bâtonnage

D. Élevage

68. Which component of grapes provides the primary source of fermentable sugars?

A. Skins

B. Seeds

C. Pulp (flesh)

D. Stems

69. What is the purpose of adjusting must acidity before fermentation?

A. Improve color

B. Increase alcohol

C. Speed fermentation

D. Ensure balanced wine and proper fermentation conditions

70. Which wine style typically avoids malolactic fermentation to preserve freshness?

A. Crisp, aromatic white wines

B. Full-bodied Chardonnay

C. Red Burgundy

D. Oaked Rioja

71. What is the term for wine aged in large, old oak vessels that impart minimal flavor?

A. Barrique-aged

B. Foudre or botte-aged

C. Tank-aged

D. Amphora-aged

72. Which factor most affects the rate of fermentation?

A. Barrel size

B. Pressing method

C. Temperature

D. Filtration type

73. What is the term for the controlled introduction of small amounts of oxygen during aging?

A. Oxidation

B. Racking

C. Aeration

D. Micro-oxygenation

74. Which winemaking technique involves harvesting grapes at different ripeness levels?

A. Tries (multiple passes)

B. Machine harvesting

C. Green harvesting

D. Night harvesting

75. What is the primary purpose of adding bentonite to white wine?

A. Remove tannins

B. Remove unstable proteins

C. Add body

D. Adjust acidity

76. Which fermentation byproduct contributes to wine's body and texture?

A. Carbon dioxide

B. Acetaldehyde

C. Glycerol

D. Hydrogen sulfide

77. What is the term for the overall care and aging of wine before bottling?

A. Vinification

B. Maceration

C. Fermentation

D. Élevage

78. Which type of oak barrel size is standard in Bordeaux?

A. 225-liter barrique

B. 228-liter pièce

C. 500-liter puncheon

D. 1000-liter foudre

79. What is the purpose of blending different grape varieties?

A. Reduce costs

B. Achieve complexity and balance

C. Speed production

D. Increase alcohol

80. Which clarification method uses materials that bind with particles for removal?

A. Filtration

B. Centrifugation

C. Fining

D. Sedimentation

81. What is the term for wines made with minimal intervention and no additives?

A. Organic wines

B. Biodynamic wines

C. Sustainable wines

D. Natural wines

82. Which sugar measurement scale is commonly used in the United States?

A. Brix

B. Baumé

C. Oechsle

D. KMW

83. What is the purpose of cold settling (débourbage) for white wines?

A. Begin fermentation

B. Clarify juice before fermentation

C. Extract color

D. Add complexity

84. Which compound forms during fermentation and contributes to wine's preservative quality?

A. Glycerol

B. Carbon dioxide

C. Alcohol (ethanol)

D. Succinic acid

85. What is the effect of whole-cluster fermentation on red wines?

A. Lighter color

B. Reduced tannins

C. Faster fermentation

D. Added stem tannins and aromatic complexity

86. Which oak treatment involves briefly charring the barrel interior?

A. Toasting

B. Seasoning

C. Shaving

D. Steaming

87. What is the term for the second fermentation that produces sparkling wine in bottle?

A. Malolactic fermentation

B. Prise de mousse

C. Carbonic maceration

D. Refermentation

88. Which winemaking practice involves leaving wine in contact with skins after fermentation?

A. Cold soaking

B. Carbonic maceration

C. Extended maceration

D. Pre-fermentation extraction

89. What is the purpose of reverse osmosis in winemaking?

A. Add sweetness

B. Increase tannins

C. Improve color

D. Remove water, alcohol, or volatile acidity

90. Which factor determines whether wine undergoes malolactic fermentation?

A. Winemaker decision based on desired style

B. Grape variety only

C. Alcohol level only

D. Fermentation temperature only

91. What is the term for adding alcohol to stop fermentation in sweet wine production?

A. Chaptalization

B. Fortification (mutage)

C. Enrichment

D. Stabilization

92. Which wine component provides the substrate for malolactic bacteria?

A. Tartaric acid

B. Alcohol

C. Malic acid

D. Residual sugar

93. What is the effect of using wild (indigenous) yeast for fermentation?

A. Faster fermentation

B. More predictable results

C. Higher alcohol

D. Potentially more complexity and site character

94. Which technique involves freezing grapes to concentrate sugars?

A. Cryoextraction

B. Passerillage

C. Botrytis infection

D. Late harvesting

95. What is the purpose of adding tannin powder during red wine production?

A. Lighten color

B. Improve structure and color stability

C. Reduce acidity

D. Speed fermentation

96. Which vessel provides the most neutral aging environment?

A. New oak barrel

B. Amphora

C. Stainless steel tank

D. Concrete egg

97. What is the term for the controlled exposure of grapes or wine to heat?

A. Cold stabilization

B. Cryoextraction

C. Saignée

D. Thermovinification

98. Which winemaking practice is prohibited in most European quality wine production?

A. Irrigation (in some regions) and certain additives

B. Oak aging

C. Malolactic fermentation

D. Hand harvesting

99. What is the primary purpose of using inert gas during bottling?

A. Speed the process

B. Prevent oxidation

C. Sterilize bottles

D. Add carbonation

100. Which filtration method is gentlest on wine quality?

A. Sterile filtration

B. Diatomaceous earth filtration

C. Cross-flow filtration

D. Pad filtration

Answer Explanations

1. A. Crushing purpose - Crushing releases juice from grapes and exposes the pulp to yeast, initiating fermentation. This process breaks berry skins while ideally leaving seeds intact to avoid releasing bitter compounds.

2. C. White wine fermentation vessel - Stainless steel tanks are preferred for white wine fermentation because they allow precise temperature control, preserve fresh fruit character, and are easy to clean and maintain.

3. B. Solid matter term - The cap (chapeau in French) refers to grape skins, seeds, and pulp that float to the surface during red wine fermentation, buoyed by carbon dioxide. Managing the cap is essential for extraction.

4. D. Acid conversion process - Malolactic fermentation (MLF) converts sharp malic acid to softer lactic acid through bacterial action, reducing total acidity and adding complexity and buttery notes to wine.

5. A. Fermentation byproduct - Carbon dioxide is produced alongside ethanol during alcoholic fermentation. In still wine production, this gas escapes; in sparkling wine, it's trapped to create bubbles.

6. C. Juice circulation technique - Pump over (remontage) circulates juice from the tank bottom over the floating cap, extracting color and tannins while keeping the cap moist and preventing bacterial growth.

7. B. Cold soak purpose - Cold soaking extracts water-soluble color compounds and fruit character from skins before fermentation begins, without extracting harsh tannins that require alcohol for dissolution.

8. D. Fish-derived fining agent - Isinglass is a collagen-based fining agent derived from fish swim bladders, traditionally used to clarify white wines by gently removing haze-causing particles.

9. C. Yeast contact term - Lees contact (sur lie aging) keeps wine in contact with dead yeast cells, adding texture, complexity, and protection from oxidation. This technique is important for Muscadet and many Chardonnays.

10. A. Low-oxygen winemaking - Reductive winemaking minimizes oxygen exposure through inert gas blanketing, careful transfers, and early bottling, preserving fresh fruit character and preventing oxidation.

11. B. Lees stirring purpose - Bâtonnage (lees stirring) suspends dead yeast cells throughout the wine, releasing compounds that add texture, richness, and complexity while protecting against oxidation.

12. D. Gentle press type - Membrane (bladder) presses use an inflatable bladder to gently squeeze grapes against a perforated cylinder, providing even pressure and high-quality juice with minimal harsh extraction.

13. C. White wine fermentation temperature - White wines typically ferment at 12-18°C (54-64°F) to preserve delicate aromas and fresh fruit character. Higher temperatures risk losing aromatic compounds.

14. A. Protective additive - Sulfur dioxide (SO2) prevents oxidation and inhibits unwanted bacteria and wild yeast. It's the most important additive in conventional winemaking for preservation.

15. B. Sediment separation term - Racking transfers clear wine off sediment (lees) into a clean vessel. Multiple rackings progressively clarify wine while providing controlled oxygen exposure.

16. D. Vanilla oak type - American oak imparts more pronounced vanilla and coconut flavors due to higher lactone content compared to the subtler spice and toast of French oak.

17. A. Sugar addition purpose - Chaptalization adds sugar to must before fermentation to increase potential alcohol in cool regions where grapes may not achieve full ripeness. It's prohibited in many warm regions.

18. C. Rosé production method - Most rosé is made through limited skin contact—either saignée (bleeding off juice from red wine tanks) or direct pressing of red grapes with minimal maceration.

19. B. First juice term - Free-run juice flows naturally from crushed grapes before pressing, generally considered higher quality than press juice due to lower tannins and solids content.

20. D. Neutral fermentation vessel - Stainless steel tanks add no flavor to wine, allowing pure expression of grape character. They're preferred when fruit purity is the primary goal.

21. C. Cold stabilization purpose - Cold stabilization precipitates tartrate crystals by chilling wine near freezing point, preventing unsightly crystal formation in bottles after purchase.

22. A. Fermentation organism - Saccharomyces cerevisiae is the primary yeast species for alcoholic fermentation, converting grape sugars to alcohol and carbon dioxide while producing flavor compounds.

23. B. Traditional Port treading - Lagares are shallow stone or concrete troughs where grapes are foot-trodden in traditional Port production, providing gentle extraction of color and tannins from thick-skinned grapes.

24. D. In-barrel fermentation - Barrel fermentation conducts primary fermentation in oak barrels rather than tanks, integrating oak character more subtly and often producing wines with better oak integration.

25. C. Yeast nutrient purpose - Yeast nutrients (typically nitrogen compounds) prevent stuck fermentation by ensuring yeast have adequate nutrition to complete sugar conversion without stress.

26. A. Best pressing method - Gentle, whole-cluster pressing produces the highest quality juice with minimal harsh tannins and solids. This technique is standard for premium white wines and Champagne.

27. D. Sugar enrichment term - Enrichment broadly refers to increasing sugar levels, while süssreserve specifically involves adding unfermented grape juice to finished wine for sweetness (common in Germany).

28. B. Oxygen-limiting closure - Screwcaps (Stelvin closures) allow minimal oxygen transmission, providing consistent aging conditions and preventing cork taint. They're increasingly used for quality wines.

29. A. Bordeaux barrel term - Barrique refers to the 225-liter oak barrel standard in Bordeaux. The Burgundian equivalent, pièce, holds 228 liters—a small but notable difference.

30. C. Whole-berry fermentation - Carbonic maceration ferments whole berries in a carbon dioxide atmosphere, producing fruity, low-tannin wines with distinctive banana and bubblegum aromas, as in Beaujolais.

31. D. Micro-oxygenation purpose - Micro-oxygenation introduces tiny, controlled amounts of oxygen to soften tannins, stabilize color through polymerization, and develop wine without barrel aging.

32. B. Juice extraction enzyme - Pectinase breaks down pectin in grape cell walls, improving juice extraction, clarification, and filterability. It's commonly added during crushing or pressing.

33. A. White grape solids term - Gross lees are the heavy sediment that settles quickly after crushing white grapes, containing pulp fragments, skins particles, and other solids removed before fermentation.

34. C. Red wine fermentation temperature - Red wines typically ferment at 20-30°C (68-86°F) to maximize extraction of color, tannins, and flavor compounds from skins during maceration.

35. D. New oak effect - New oak barrels impart more pronounced vanilla, toast, and spice flavors compared to older barrels, which become increasingly neutral after several uses.

36. B. Gravity clarification - Sedimentation uses gravity to settle particles naturally over time. This gentle method preserves wine quality but requires patience and multiple rackings.

37. A. Destemming purpose - Removing stems eliminates harsh, green tannins that can contribute unpleasant vegetal character. Some winemakers include stems deliberately for structure and complexity.

38. D. MLF wine styles - Most red wines and full-bodied white wines (especially oaked Chardonnay) undergo malolactic fermentation for softness and complexity, while crisp whites avoid it.

39. C. Sweet reserve term - Süssreserve is unfermented grape juice added to finished wine to provide sweetness, commonly used in German winemaking to balance high acidity in off-dry styles.

40. B. Tannin fining agent - Egg whites (albumin) effectively bind with and precipitate excess tannins, softening astringent red wines. This traditional method remains common in Bordeaux.

41. A. Inert gas purpose - Inert gases (nitrogen, argon, carbon dioxide) blanket wine surfaces to prevent oxygen contact during storage, transfer, and bottling, protecting against oxidation.

42. D. Renewed vessel interest - Concrete vessels, including egg-shaped tanks, have gained popularity for providing subtle micro-oxygenation similar to barrels while remaining flavor-neutral.

43. C. Frozen grape wine - Icewine (Eiswein) is made from grapes naturally frozen on the vine, concentrating sugars as water crystallizes. Canadian and German examples are most renowned.

44. B. Vanilla compound - Vanillin in oak provides characteristic vanilla aromas and flavors. Levels vary by oak species, grain tightness, and toasting level during cooperage.

45. A. Délestage purpose - Délestage (rack and return) drains fermenting wine from the tank, allowing the cap to compact, then returns wine over it for aeration and tannin softening.

46. D. Indigenous fermentation - Spontaneous (wild) fermentation relies on indigenous yeasts present on grape skins and in the winery rather than commercial yeast additions, potentially adding complexity.

47. C. Extended maceration effect - Continued skin contact after fermentation extracts additional tannins, though these late-extracted tannins may be softer than those released during fermentation.

48. B. Common acidification addition - Tartaric acid is preferred for acidification because it occurs naturally in grapes and provides stable acidity without adding undesirable flavors.

49. D. Douro treading vessels - Lagares are traditional rectangular stone or concrete troughs in the Douro Valley where foot-treading extracts color and tannins for Port production.

50. A. Dry versus sweet determination - Stopping fermentation before all sugar converts to alcohol leaves residual sweetness. Fermentation to dryness (complete sugar conversion) produces dry wine.

51. C. Oak toasting purpose - Toasting caramelizes wood sugars and breaks down lignin, developing flavor compounds including vanillin, lactones, and spicy phenolics that transfer to wine.

52. B. Finest filtration - Sterile (membrane) filtration removes particles down to 0.45 microns, eliminating yeast and most bacteria. This enables bottling without risk of refermentation.

53. D. Dried grape wine - Passito (or appassimento) wines are made from grapes dried before pressing, concentrating sugars and flavors. Examples include Amarone and Vin Santo.

54. A. Extraction factors - Temperature and maceration time most influence color and tannin extraction. Higher temperatures and longer contact increase extraction, requiring careful management.

55. B. Cultured yeast purpose - Commercial yeast strains ensure predictable, reliable fermentation with known characteristics. Selected yeasts reduce risk of stuck fermentation or off-flavors.

56. C. Deliberate oxygen exposure - Oxidative winemaking intentionally exposes wine to oxygen, developing nutty, complex flavors as in Sherry, Vin Jaune, and some traditional whites.

57. D. Post-fermentation pressing - Pressing separates wine from skins and seeds after red wine fermentation completes. Press wine contains more tannins than free-run and may be blended or kept separate.

58. A. Smoky oak compound - Guaiacol produces smoky, charred aromas in toasted oak, contributing to the complexity of barrel-aged wines alongside vanilla and spice compounds.

59. B. Alcohol from Brix - Grapes at 25 Brix (approximately 25% sugar) typically produce wines of 13-14% alcohol, as roughly half the sugar weight converts to alcohol during fermentation.

60. C. Oxygen permeable vessel - Oak barrels allow gradual oxygen transmission through the wood, enabling slow oxidative development that softens tannins and adds complexity during aging.

61. D. Natural settling term - Sedimentation describes the natural settling of suspended particles over time under gravity's influence, a gentle clarification method requiring patience.

62. A. Spinning separation - Centrifugation uses centrifugal force to rapidly separate solids from liquid, clarifying wine quickly but potentially stripping some flavor compounds.

63. B. Punch down purpose - Punch downs (pigeage) submerge the floating cap into fermenting wine, ensuring color and tannin extraction while preventing the cap from drying and spoiling.

64. C. Lightest rosé method - Direct pressing of red grapes with minimal skin contact produces the palest rosé wines. Saignée and maceration methods yield deeper-colored wines.

65. D. Extended barrel aging effect - Longer barrel aging develops more oxidative character, integrates oak flavors, and softens tannins through polymerization, producing rounder wines.

66. A. Milk protein fining - Casein is derived from milk protein and effectively removes brown colors and oxidative character from white wines. It must be declared due to allergen regulations.

67. B. Fine lees aging term - Sur lie aging keeps wine in contact with fine yeast lees after fermentation, adding texture, protecting against oxidation, and developing complexity.

68. C. Sugar source - Grape pulp (flesh) contains the fermentable sugars (glucose and fructose) that yeast converts to alcohol. Skins contribute color, tannins, and flavor compounds.

69. D. Acidity adjustment purpose - Adjusting must acidity ensures proper fermentation conditions and balanced finished wine. Low acidity risks microbial instability; high acidity may require amelioration.

70. A. Wines avoiding MLF - Crisp, aromatic whites like Riesling and Sauvignon Blanc avoid malolactic fermentation to preserve fresh acidity and pure varietal character.

71. B. Large neutral oak term - Foudres (large French oak) and botte (Italian equivalent) age wine with minimal oak flavor impact, providing gentle oxygen exposure without dominant wood character.

72. C. Fermentation rate factor - Temperature most affects fermentation rate. Higher temperatures accelerate yeast activity but risk volatile compound loss; cooler fermentations proceed slowly but preserve aromatics.

73. D. Controlled oxygen term - Micro-oxygenation delivers precise, small oxygen doses through ceramic diffusers, mimicking barrel aging effects for wines in tank without wood contact.

74. A. Multiple harvest passes - Tries involve multiple harvest passes through vineyards to pick grapes at optimal ripeness, particularly important for botrytized wines where infection spreads unevenly.

75. B. Bentonite purpose - Bentonite clay effectively removes unstable proteins from white wine that could cause haze after bottling. This negatively charged clay binds positively charged proteins.

76. C. Body-building byproduct - Glycerol is a fermentation byproduct contributing to wine's body, texture, and perception of sweetness. Levels increase with higher fermentation temperatures.

77. D. Aging term - Élevage (French for "raising" or "upbringing") encompasses all winemaking activities between fermentation and bottling, including aging, clarification, and blending.

78. A. Bordeaux barrel size - The 225-liter barrique is standard in Bordeaux, while Burgundy uses the slightly larger 228-liter pièce. These small barrels provide significant oak influence.

79. B. Blending purpose - Blending different varieties achieves complexity and balance unattainable with single varieties, combining strengths while minimizing individual weaknesses.

80. C. Binding clarification - Fining uses substances that bind with specific particles (proteins, tannins, color compounds) forming larger aggregates that settle out of wine for removal.

81. D. Minimal intervention wines - Natural wines are made with minimal intervention and few or no additives (including sulfur dioxide), relying on indigenous yeasts and natural processes.

82. A. American sugar scale - Brix measures sugar as percentage of weight in the United States and Australia. One degree Brix equals one gram of sugar per 100 grams of solution.

83. B. Cold settling purpose - Débourbage (cold settling) clarifies white grape juice before fermentation by chilling to slow yeast activity while solids settle, producing cleaner fermentations.

84. C. Preservative compound - Alcohol (ethanol) provides significant preservative effect in wine, inhibiting many spoilage organisms. Higher alcohol wines generally resist microbial spoilage better.

85. D. Whole-cluster effect - Whole-cluster fermentation includes stems, adding tannin structure, aromatic complexity (often described as spicy or stemmy), and potentially reducing alcohol perception.

86. A. Barrel heat treatment - Toasting involves heating barrel interiors over an open fire, developing flavor compounds through caramelization and lignin breakdown. Toast levels range from light to heavy.

87. B. Champagne second fermentation - Prise de mousse ("capturing the sparkle") is the second fermentation that creates bubbles in traditional method sparkling wines like Champagne.

88. C. Post-fermentation skin contact - Extended maceration continues skin contact after fermentation completes, extracting additional (often softer) tannins and deepening color in red wines.

89. D. Reverse osmosis uses - Reverse osmosis concentrates wine by removing water (illegal in some regions), reduces alcohol by separating alcohol from wine, or removes volatile acidity.

90. A. MLF decision factor - Winemakers choose whether to encourage or prevent malolactic fermentation based on desired wine style—softness and complexity versus preservation of fresh acidity.

91. B. Alcohol addition term - Fortification (mutage) adds grape spirit to fermenting wine, raising alcohol to levels that kill yeast and stop fermentation, preserving natural grape sweetness.

92. C. MLF substrate - Malic acid is the substrate for malolactic bacteria (primarily Oenococcus oeni), which convert it to lactic acid plus carbon dioxide, reducing total acidity.

93. D. Wild yeast effect - Indigenous yeasts may contribute greater complexity and site-specific character than commercial strains, though with increased risk of stuck fermentation or off-flavors.

94. A. Artificial freezing technique - Cryoextraction artificially freezes grapes (or must) to concentrate sugars by removing water as ice, mimicking natural icewine conditions in a controlled environment.

95. B. Tannin addition purpose - Adding tannin powder improves structure, aids color stability through copigmentation, and can enhance aging potential in wines from grapes with naturally low tannins.

96. C. Most neutral vessel - Stainless steel provides the most neutral aging environment, imparting no flavor and allowing minimal oxygen contact. Wines aged this way show pure fruit character.

97. D. Heat treatment term - Thermovinification uses heat to extract color quickly from grape skins, employed for some inexpensive red wines or grapes affected by rot where rapid processing is advantageous.

98. A. European prohibitions - Certain practices including irrigation (in some regions), chaptalization (in warm areas), and various additives permitted elsewhere are restricted in European quality wine production.

99. B. Bottling gas purpose - Inert gas during bottling displaces oxygen from bottles and headspace, preventing oxidation that could occur between filling and corking.

100. C. Gentle filtration method - Cross-flow filtration passes wine across (rather than through) a membrane, providing effective clarification while being gentler on wine structure than traditional filtration methods.