APPRENTI DU VIN

# WSET Level 3 Award in Wines

Paper 02 — Answer Key & Explanations

## Paper 1: Multiple Choice

**1. B** — Health awareness campaigns, changing lifestyles, and competition from craft beer, spirits, and no/low-alcohol alternatives are reducing per-capita wine consumption in traditional markets

*Global wine consumption has been declining since 2018, driven by health awareness (particularly alcohol moderation movements like Dry January), competition from craft beer, premium spirits, and the growing no/low-alcohol category, and generational shifts (younger consumers drinking less overall). Traditional high-consumption markets (France, Italy, Spain) have seen decades-long declines. The industry is responding with premiumisation, innovation, and lighter/lower-alcohol wines.*

**2. B** — Increasing consumer demand for transparency, sustainability, and perceived health benefits

*The growth of organic wine production (global organic vineyard area has more than tripled since 2005) is driven primarily by consumer demand for sustainable, transparent, and health-conscious products. Millennials and Gen Z consumers are particularly receptive. Organic farming typically produces lower yields and higher costs, which are offset by premium pricing. There is no EU mandate for universal organic certification.*

**3. B** — A sharp, pungent aroma reminiscent of a struck match or burnt rubber

*Excessive free SO2 produces a sharp, pungent, acrid sensation on the nose, often described as a struck match or chemical/burnt rubber character. It can also cause a tingling or burning sensation in the nasal passages. Sensitive individuals may detect SO2 at lower thresholds. Vinegar aromas indicate volatile acidity (acetic acid), not SO2.*

**4. B** — Cross-flow filtration passes wine parallel to the membrane, reducing clogging and allowing continuous operation

*In cross-flow (tangential) filtration, wine flows parallel to the membrane surface rather than perpendicular to it. This creates a self-cleaning action that reduces clogging, allows continuous operation, and minimises wine loss. Traditional pad filtration passes wine perpendicularly through filter sheets, which can clog and require frequent replacement. Cross-flow is increasingly preferred for its efficiency and consistency.*

**5. B** — Adds body, creaminess, and complexity by releasing mannoproteins and amino acids

*Batonnage stirs settled fine lees (dead yeast cells) back into suspension, promoting the release of mannoproteins and amino acids through autolysis. This adds body, mouthfeel, creaminess, and complexity (bread, biscuit notes) to white wines. It also enhances resistance to oxidation. The technique is classic for barrel-fermented Chardonnay in Burgundy.*

**6. B** — Leaf removal in the fruit zone

*Leaf removal (or leaf pulling) in the fruit zone directly improves sunlight exposure to the bunches, promoting even ripening, reducing disease pressure by improving air circulation, and enhancing colour and flavour development. Increasing irrigation or bud numbers would increase canopy density, worsening the problem.*

**7. B** — They allow small growers to pool resources for winemaking, marketing, and distribution, achieving economies of scale that individual smallholders could not

*Wine cooperatives aggregate production from many small growers who individually could not afford winemaking equipment, storage, marketing, or distribution. This is particularly important in fragmented regions (e.g., Languedoc, parts of Germany, southern Italy). Cooperatives account for a significant share of production in many countries. Quality ranges widely; some cooperatives produce excellent wine, while others focus on volume. They are not mandated by law.*

**8. B** — An aged wine or one with significant oxidative handling

*White wines deepen in colour as they age, moving from lemon to gold to amber. A deep gold with amber rim suggests either significant bottle age, oxidative winemaking (extended oak ageing, deliberate oxidation as in Jura Vin Jaune), or both. Young, cool-climate whites are typically pale lemon. Residual sugar does not directly cause deep gold colour.*

**9. A** — Bentonite

*Bentonite is a negatively charged clay that attracts positively charged proteins, removing them from wine (protein stabilisation, especially important in whites). The question describes the opposite mechanism: egg white (albumin), isinglass, and casein are positively charged protein-based fining agents that bind with negatively charged tannins and phenolics, softening red wines. Note: bentonite itself carries a negative charge and attracts positive proteins. Egg white carries a positive charge that attracts negative tannins.*

**10. B** — Mousse quality (bubble size, persistence, and integration)

*For sparkling wines, the SAT appearance assessment includes mousse quality: the size of the bubbles (fine bubbles are preferred), their persistence (a steady, continuous stream is positive), and their integration with the wine. Fine, persistent mousse is associated with quality, extended lees ageing, and the traditional method. Coarse, short-lived bubbles suggest lesser quality or the tank method.*

**11. B** — Minimum 80% Sangiovese, with up to 20% other approved red varieties (including Cabernet Sauvignon and Merlot); white grapes are no longer permitted

*Chianti Classico DOCG requires a minimum of 80% Sangiovese. Up to 20% may be other approved red varieties, including indigenous grapes (Canaiolo, Colorino) and international varieties (Cabernet Sauvignon, Merlot). The mandatory inclusion of white grapes (Trebbiano, Malvasia) was removed in 2006. The Gran Selezione tier, introduced in 2014, represents the top level.*

**12. C** — Cornas

*Cornas is the only Northern Rhone appellation that permits exclusively red wine, and no co-fermentation with white grapes is allowed (unlike Cote-Rotie and Hermitage). Its south-facing granite amphitheatre produces powerful, tannic, long-lived Syrah. Hermitage also produces white wines (from Marsanne and Roussanne). Condrieu is a white-only appellation (Viognier). Saint-Joseph produces both red and white.*

**13. C** — Natural cork

*TCA is most commonly associated with natural cork, where it develops from the interaction of chlorine-based compounds with naturally occurring fungi in cork bark. TCA causes 'cork taint', giving wine a musty, wet cardboard character at concentrations as low as 2-4 parts per trillion. Screwcaps and glass stoppers eliminate this risk. Industry estimates suggest 1-3% of wines sealed with natural cork may be affected.*

**14. B** — Marsanne and Roussanne

*White Hermitage is made from Marsanne and/or Roussanne. These varieties may also be co-fermented with Syrah in red Hermitage (up to 15%). Viognier is the exclusive white variety of Condrieu and Chateau-Grillet, not Hermitage. Clairette and Bourboulenc are Southern Rhone varieties. White Hermitage can be exceptionally long-lived.*

**15. B** — Serving the wine at 8-10 degrees Celsius

*Serving red wine too cold (below 14 degrees C) accentuates tannin perception, making the wine taste more austere and astringent. It also suppresses fruit aromas. The ideal serving temperature for full-bodied reds is 16-18 degrees C. Decanting softens tannins through aeration, and large-bowled glasses promote aroma release. Overly warm temperatures (above 20 degrees C) emphasise alcohol.*

**16. D** — Inoculation with commercial yeast strains and heavy SO2 additions

*Natural wine producers generally avoid commercial yeast inoculation, heavy SO2 additions, fining, and filtration. They favour spontaneous fermentation, minimal intervention, and little to no added SO2 (though some add a small amount at bottling). There is no single legal definition, but the core philosophy emphasises minimal human and chemical intervention in both vineyard and cellar.*

**17. A** — A high-trained canopy system where shoots hang downward from an overhead framework

*The Pergola (or tendone) system trains vines overhead on a horizontal or slightly inclined framework. Shoots and fruit hang downward, providing shade from intense sunlight. It is traditional in northern Italy (Trentino-Alto Adige) and parts of southern Italy. The system produces high yields and is suited to fertile soils and vigorous varieties.*

**18. B** — Tariffs can significantly shift trade flows, with importing countries redirecting purchases to non-tariffed sources and affected exporters losing market share

*Tariffs have a measurable and significant impact on wine trade. For example, US tariffs on EU wines (25% on still wines from France, Germany, Spain, UK) imposed in 2019 caused significant shifts: French wine exports to the US dropped sharply, while non-tariffed producers (Chile, Argentina, New Zealand) gained market share. When tariffs were suspended in 2021, French exports rebounded. This demonstrates the price sensitivity of wine markets.*

**19. B** — Screwcaps eliminate TCA taint risk and provide consistent seal quality, reducing both financial losses and brand damage from faulty bottles

*The economic case for screwcaps centres on eliminating TCA taint (estimated to affect 1-3% of cork-sealed bottles), which represents both direct financial loss and damage to brand reputation. Screwcaps also offer batch-to-batch consistency. Cork industry advocates counter that cork forests are sustainable ecosystems supporting biodiversity, and that cork provides controlled oxygen ingress that benefits ageing. The debate remains active, with regional and stylistic preferences varying.*

**20. C** — Pomerol

*Pomerol, on the Right Bank, is dominated by Merlot (typically 80-100% of blends) grown on clay and gravel soils with a distinctive iron-rich subsoil (crasse de fer). Estates are notably small (Chateau Petrus is just 11.5 hectares). Pomerol has no classification system, unlike Saint-Emilion. Pauillac, Saint-Julien, and Margaux are Left Bank communes dominated by Cabernet Sauvignon.*

**21. B** — The Tyrrhenian coast of the Maremma in western Tuscany

*Bolgheri is a coastal DOC in the Maremma on Tuscany's western Tyrrhenian coast. Its maritime climate, gravelly and clay soils, and proximity to the sea create conditions well-suited to Cabernet Sauvignon, Merlot, and Cabernet Franc. Sassicaia (Tenuta San Guido) was the pioneer, first planted in the 1940s. The DOC was established in 1994, with Sassicaia receiving its own sub-DOC.*

**22. B** — The gradual ingress of oxygen through the pores of the oak staves and the bung

*Oak barrels allow a small, controlled amount of oxygen to permeate through the wood grain and around the bung. This slow micro-oxygenation promotes tannin polymerisation (softening tannins), colour stabilisation (through anthocyanin-tannin bonding), and the development of tertiary aromas. A 225-litre barrel typically allows 15-45 mg/L of oxygen exposure per year, depending on wood tightness and barrel age.*

**23. C** — Winemaker's choice of yeast strain

*Terroir refers to the complete natural environment in which a wine is produced, including climate (macro, meso, and micro), soil, topography (aspect, altitude, slope), and grape variety. While human factors such as yeast selection influence the final wine, they are winemaking decisions rather than components of terroir in its traditional sense.*

**24. C** — Blue and grey slate (Devonian)

*The steep slopes of the Mosel are predominantly composed of Devonian slate (blue and grey). Slate retains and radiates heat, which is critical for ripening Riesling in this cool, northerly climate. It also provides excellent drainage on the steep vineyard sites. Chalk and limestone are more associated with Champagne and Burgundy.*

**25. B** — A precisely delimited vineyard parcel with distinct geological and climatic characteristics

*In Burgundy, a climat is a precisely defined vineyard parcel distinguished by its unique combination of soil, subsoil, exposure, altitude, and microclimate. Burgundy's climats were inscribed as a UNESCO World Heritage Site in 2015. The Cote d'Or alone contains over 1,200 climats. This concept underpins the entire Burgundian philosophy of terroir expression.*

**26. A** — Burgundy classifies individual vineyard plots (climats) while Bordeaux's 1855 Classification classifies chateaux (estates/brands)

*Burgundy's classification is terroir-based: specific vineyard parcels (climats) are classified as Grand Cru or Premier Cru regardless of who owns or farms them. Bordeaux's 1855 Classification ranks chateaux (estates) rather than specific plots; a classified chateau can buy or sell parcels while retaining its classification. This fundamental difference reflects Burgundy's emphasis on terroir versus Bordeaux's emphasis on brand and estate reputation.*

**27. B** — Regional, Village, Premier Cru, Grand Cru

*Burgundy's quality pyramid runs from broadest to most specific: Regional (e.g., Bourgogne Rouge), Village (e.g., Gevrey-Chambertin), Premier Cru (e.g., Gevrey-Chambertin 1er Cru Clos Saint-Jacques), and Grand Cru (e.g., Chambertin). Grand Crus represent the pinnacle, with just 33 sites accounting for about 1.5% of total production.*

**28. B** — Level and nature (e.g. fine-grained, coarse, chalky, velvety)

*At WSET Level 3, tannin assessment on the palate includes both the level (low, medium-, medium, medium+, high) and the nature/quality of the tannin (e.g. ripe vs unripe, fine-grained vs coarse, soft vs grippy, chalky, velvety). This qualitative assessment is important for evaluating wine quality and ageing potential. Tannin is perceived as a drying, astringent sensation on the gums and palate.*

**29. C** — Howell Mountain

*Howell Mountain is a high-altitude sub-AVA (minimum elevation 427 metres / 1,400 feet) located above the fog line on the eastern slopes of the Vaca Mountains. Its volcanic soils (ash and tufa) and elevation produce intense, concentrated Cabernet Sauvignon with firm tannins. Stags Leap District and Rutherford are valley-floor appellations. Carneros, at the southern end, is cooler and known for Pinot Noir and Chardonnay.*

**30. B** — Butter and cream from malolactic fermentation

*Secondary aromas derive from winemaking processes, primarily fermentation and post-fermentation techniques. Butter and cream (diacetyl) come from malolactic fermentation. Other secondary aromas include bread/biscuit (lees contact), vanilla/toast (oak). Primary aromas come from the grape variety (blackcurrant). Tertiary aromas develop from ageing (leather, tobacco, petrol).*

**31. B** — Because fixed costs (duty, VAT, transport, packaging, margins) are constant, so a small increase in retail price means a much larger increase in the amount spent on the wine itself

*Fixed costs such as duty, VAT, bottling, transport, labelling, and retail margins remain relatively constant regardless of wine quality. For a GBP 5 bottle, as little as GBP 0.50 may go to the actual wine. Moving to GBP 8 might triple the wine cost to GBP 1.50. At GBP 15, the wine itself might receive GBP 4-5, representing a tenfold increase in wine quality budget. This is why the jump in quality from entry-level to mid-range wines is often dramatic.*

**32. A** — Chablis is made from Chardonnay grown on Kimmeridgian limestone, and Grand Cru vineyards face south-west

*Chablis is 100% Chardonnay grown on Kimmeridgian limestone (ancient marine deposits containing fossilised oyster shells). The seven Grand Crus are all located on a single south-west facing slope on the right bank of the Serein river, maximising sun exposure in this cool, continental climate. Most Chablis producers favour stainless steel or old oak to preserve the wine's characteristic flinty minerality.*

**33. B** — By shifting optimal growing conditions away from historically classified sites, potentially making traditional varieties and styles unviable in their current locations

*Climate change threatens the fundamental premise of appellation systems: that specific sites produce distinctive wines due to their unique terroir. Rising temperatures may make traditional varieties unviable (e.g., Pinot Noir in parts of Burgundy becoming too warm) or shift optimal conditions to previously marginal areas (e.g., southern England). This challenges classifications based on historical quality and raises questions about permitted varieties and stylistic expectations.*

**34. B** — Temperature decreases with altitude, preserving acidity and extending the growing season

*Temperature drops approximately 0.6 degrees C for every 100 metres of altitude gained (the lapse rate). In warm regions, this cooling effect preserves natural acidity and extends the growing season, allowing for more gradual, balanced ripening. This is exploited in regions like Mendoza (Argentina), Etna (Sicily), and parts of the Swartland (South Africa).*

**35. D** — Heavy toast

*Heavy toast breaks down more of the oak's cellulose and lignin, producing guaiacol (smoky) and furfural (coffee, toffee) compounds. Light toast preserves more raw wood character (coconut, sawdust). Medium toast offers a balance of vanilla, spice, and toast. The choice of toast level is a critical winemaking decision that shapes the aromatic profile of oak-aged wines.*

**36. B** — Light-bodied, deeply coloured, and fruity with low tannin, designed for early drinking

*Carbonic maceration involves fermenting whole, uncrushed grapes in a CO2-rich environment. Intracellular fermentation within the intact berries produces deeply coloured, fruity wines (banana, bubblegum, kirsch) with soft tannins, suited to early consumption. It is the signature technique of Beaujolais Nouveau. The process extracts colour from the skins without the harsh tannin extraction of traditional maceration.*

**37. B** — Clay retains water, ensuring consistent vine hydration, and is often cooler, slowing ripening slightly

*Clay soils have high water-holding capacity, providing consistent moisture to vines even in dry periods. They tend to be cooler and more fertile than sandy or gravelly soils. This ensures steady vegetative growth and can produce wines with body and weight. The right bank of Bordeaux (Saint-Emilion, Pomerol) demonstrates how Merlot thrives on clay-dominant soils.*

**38. C** — Pinot Noir

*Pinot Noir typically produces wines that are pale to medium ruby in colour with a translucent, watery rim, due to its thin skins and lower anthocyanin content. Cabernet Sauvignon, Malbec, and Syrah are all thick-skinned varieties that produce deeply coloured, opaque wines. Colour intensity is an important varietal indicator when using the SAT.*

**39. B** — Balance, Length, Intensity, and Complexity

*The BLIC framework assesses wine quality through four criteria: Balance (harmony between acidity, sweetness, tannin, alcohol, and fruit), Length (how long flavours persist on the finish), Intensity (concentration and depth of flavours), and Complexity (range and layering of aromas and flavours). A wine scoring highly on all four criteria would be assessed as outstanding quality.*

**40. B** — To act as both an antioxidant and antimicrobial agent

*SO2 serves two critical functions: as an antioxidant (protecting wine from oxidation by reacting with hydrogen peroxide and acetaldehyde) and as an antimicrobial agent (inhibiting unwanted bacteria and wild yeasts). It is added at various stages from crushing to bottling. The molecular (free) form is the most effective antimicrobial agent; its proportion increases at lower pH.*

**41. B** — Varietal substitution

*Varietal substitution refers to replacing traditional varieties with those better adapted to the changing climate. For example, some producers in traditionally cool regions are trialling heat-tolerant varieties like Grenache or Mouvedre. Deficit irrigation manages water stress but does not address fundamental suitability. Green harvesting and shoot thinning are yield management tools.*

**42. A** — A minimum of 24 months total ageing with at least 6 months in oak for red wines

*Spanish Crianza reds require a minimum of 24 months total ageing, with at least 6 months in oak barrels (in Rioja and Ribera del Duero, this is extended to 12 months in oak). Reserva requires 36 months total (12 in oak), and Gran Reserva requires 60 months total (18 in oak). These ageing classifications are specific to Spanish wine law and are central to the marketing and pricing of Spanish wines.*

**43. B** — Barnyard, band-aid, and sweaty saddle

*Brettanomyces is a spoilage yeast that produces 4-ethylphenol (barnyard, horse blanket, sweaty saddle) and 4-ethylguaiacol (smoky, spicy). At low levels, some tasters find it adds complexity (particularly in some traditional Rhone and Barossa wines), but at higher levels it overwhelms fruit character and is considered a fault. It thrives in barrels and is difficult to eradicate.*

**44. B** — Pauillac features deep Quaternary gravel mounds ideal for Cabernet Sauvignon, while Saint-Emilion has diverse soils including limestone plateau, clay slopes, and sandy gravel

*Pauillac, in the Haut-Medoc on the Left Bank, sits on deep gravel mounds (croupes) deposited by the Gironde, perfect for Cabernet Sauvignon's late-ripening needs. Saint-Emilion on the Right Bank has complex soil diversity: the limestone plateau and cotes (slopes) favour Merlot and Cabernet Franc, while the graves sector near Pomerol has more gravel. Pauillac is closer to the ocean than Saint-Emilion.*

**45. B** — Gravel reflects heat, retains warmth, and provides excellent drainage, promoting stress and concentration

*The deep gravel beds of the Haut-Medoc (deposited by the Garonne and its tributaries) provide superb drainage, forcing vine roots deep in search of water. Gravel also absorbs and radiates heat, aiding ripening in this marginal maritime climate. The resulting mild water stress concentrates flavours. The best chateaux (Margaux, Pauillac) sit on the deepest gravel outcrops.*

**46. B** — Grafting Vitis vinifera onto American rootstocks remains the primary defence

*Phylloxera (Daktulosphaira vitifoliae) is a root-feeding louse that destroys Vitis vinifera roots. The solution, developed in the late 1800s, was grafting vinifera scions onto resistant American rootstocks (e.g. Vitis riparia, Vitis rupestris). Sandy soils actually resist phylloxera because the louse cannot move easily through them. Chile remains largely phylloxera-free due to geographic isolation.*

**47. B** — It created a universal, easily understood quality benchmark that influenced pricing, production styles, and consumer purchasing decisions worldwide

*Parker's 100-point system (introduced in the 1980s via The Wine Advocate) provided consumers with a simple, seemingly objective quality measure. High Parker scores could dramatically increase a wine's price and demand. Critics argue it homogenised wine styles (favouring ripe, concentrated, oaky wines), while supporters credit it with democratising wine appreciation and raising quality standards globally. Its influence has waned somewhat with the rise of diverse critics and platforms.*

**48. B** — Removes unstable proteins that could cause haze if the wine is exposed to warm temperatures

*White wines contain heat-unstable proteins that can denature and form visible haze when the wine is stored at warm temperatures. Bentonite, a negatively charged clay, adsorbs and removes these positively charged proteins, achieving protein stability. This is less of a concern in red wines because tannins naturally bind and precipitate proteins during maceration and ageing.*

**49. B** — Chateau Haut-Brion

*Chateau Haut-Brion was the only property outside the Medoc to be included in the 1855 Classification, classified as a First Growth. It is located in what is now the Pessac-Leognan appellation within the Graves. Margaux, Lafite, and Latour are in the Medoc; Mouton was elevated from Second to First Growth in 1973.*

**50. C** — Mushroom, forest floor, and dried fruit from extended bottle ageing

*Tertiary aromas develop during ageing, both in barrel and bottle. In reds, they include leather, tobacco, earth, mushroom, forest floor, dried fruit, and meat. In whites, they include honey, toast, marmalade, petrol (Riesling), and nuts. Rose petal and grapefruit are primary (grape-derived). Vanilla from oak is secondary (winemaking-derived).*

## Paper 2: Short Answer

### 51. Describe the key appellations of the Northern Rhone valley. For each, identify the permitted grape varieties, typical wine style, and any notable terroir characteristics.

*(4 marks)*

**Marking Points:**

- Cote-Rotie: Syrah (up to 20% Viognier co-fermented); steep schist and granite slopes; two main lieux-dits: Cote Blonde (lighter soils, more elegant) and Cote Brune (darker soils, more structured); perfumed, refined, with violet, black fruit, and often floral lift from Viognier
- Hermitage: Syrah for reds (up to 15% Marsanne/Roussanne permitted); Marsanne and Roussanne for whites; granite hill with varied exposures; powerful, full-bodied reds with significant ageing potential (decades); whites can also age exceptionally
- Cornas: 100% Syrah, no white grapes permitted; south-facing granite amphitheatre; the most robust and tannic Northern Rhone appellation; traditionally needs long ageing but modern styles are more approachable
- Saint-Joseph, Crozes-Hermitage, and Condrieu: Saint-Joseph (Syrah reds, Marsanne/Roussanne whites, granite soils, variable quality); Crozes-Hermitage (largest appellation, flatter land, more accessible Syrah); Condrieu (Viognier only, white, apricot/peach, full-bodied, limited production)

**Model Answer:**

*The Northern Rhone produces some of France's most distinguished wines from a narrow, steep-sided valley. Cote-Rotie ('roasted slope') at the northern end produces Syrah with the option of co-fermenting up to 20% Viognier. Its steep schist and granite slopes include the famous Cote Blonde and Cote Brune lieux-dits, producing perfumed wines with violet, black fruit, and elegant structure. Hermitage, centred on a dramatic granite hill, produces powerful, long-lived Syrah reds and age-worthy Marsanne/Roussanne whites. Up to 15% white grapes may be included in red Hermitage. The varied exposures and soil types across the hill's lieux-dits (Les Bessards, Le Meal, L'Hermite) create distinct sub-styles. Cornas produces exclusively red Syrah with no white varieties permitted, from a south-facing granite amphitheatre. These are the most robust, tannic wines of the Northern Rhone, requiring patience. Saint-Joseph, on the western bank, produces both Syrah reds and Marsanne/Roussanne whites of variable quality depending on whether grapes come from steep granite slopes or flatter, less distinguished sites. Crozes-Hermitage, the largest Northern Rhone appellation, surrounds the hill of Hermitage and produces more accessible, earlier-drinking Syrah from generally flatter terrain. Condrieu is the sole appellation for Viognier, producing rich, aromatic whites with apricot, peach, and floral character.*

## 52. Compare the terroir, grape varieties, wine styles, and classification systems of the Cote de Nuits and Cote de Beaune in Burgundy.

*(4 marks)*

**Marking Points:**

- Cote de Nuits: predominantly red wines from Pinot Noir; key villages include Gevrey-Chambertin, Chambolle-Musigny, Vosne-Romanee, Nuits-Saint-Georges; 24 of 33 Burgundy Grand Crus are here; wines tend to be structured, intense, with dark fruit, earth, and significant ageing potential
- Cote de Beaune: both red (Pinot Noir) and white (Chardonnay) wines; key villages include Pommard, Volnay (red), Meursault, Puligny-Montrachet, Chassagne-Montrachet (white); home to the great white Grand Crus (Montrachet, Batard-Montrachet, Corton-Charlemagne); reds are generally softer and more approachable than Cote de Nuits
- Terroir differences: both share the same limestone escarpment but with variations; Cote de Nuits has a narrower strip of mid-slope vineyards with Bajocian/Bathonian limestone; Cote de Beaune has a wider, gentler slope with more varied exposures and Kimmeridgian influence
- Classification system is identical for both: Regional, Village, Premier Cru, Grand Cru hierarchy based on individual climat quality; the system classifies land, not producers; same vineyard may have multiple owners (morcellement)

**Model Answer:**

*The Cote de Nuits and Cote de Beaune form the Cote d'Or, Burgundy's golden slope. The Cote de Nuits, running from Marsannay south to Corgoloin, is predominantly a red wine zone. Pinot Noir thrives in villages like Gevrey-Chambertin, Chambolle-Musigny, Vosne-Romanee, and Nuits-Saint-Georges. Twenty-four of Burgundy's 33 Grand Crus are located here, including legendary sites such as Chambertin, Musigny, Romanee-Conti, and Clos de Vougeot. Wines tend to be structured, deeply flavoured, with dark fruit, earthy complexity, and exceptional ageing potential. The vineyard strip is narrow, with the best sites on mid-slope positions. The Cote de Beaune extends from Ladoix-Serrigny south to Maranges and produces both outstanding reds and whites. Red wine villages include Pommard (structured, firm) and Volnay (elegant, perfumed). The great white wine villages -- Meursault, Puligny-Montrachet, and Chassagne-Montrachet -- produce some of the world's finest Chardonnay. Grand Crus here include Le Montrachet, Corton-Charlemagne, and Corton. The slope is generally wider with more diverse exposures. Both sub-regions share the same four-tier classification (Regional, Village, Premier Cru, Grand Cru) based on individual climats. This terroir-based system classifies the land itself, meaning the same vineyard can have multiple owners producing wines of varying quality from the same classified site.*

## 53. Describe the key principles and practices that distinguish organic, biodynamic, and sustainable viticulture from each other and from conventional farming.

*(4 marks)*

**Marking Points:**

- Organic: prohibits synthetic pesticides, herbicides, and fertilisers; permits copper-based sprays (with limits) and sulphur; requires certification (e.g., EU organic, USDA Organic); focuses on chemical inputs
- Biodynamic: includes all organic restrictions plus specific preparations (500-508), lunar/astronomical calendar planting and harvesting, and treating the vineyard as a self-sustaining ecosystem; certified by Demeter or Biodyvin
- Sustainable: holistic approach addressing environmental, social, and economic dimensions; may permit limited synthetic inputs; examples include SWNZ, HVE (France), SIP (California); not necessarily certified
- Conventional: no restrictions on synthetic chemicals, though increasingly adopting Integrated Pest Management (IPM) to reduce chemical usage; motivated by cost, efficiency, and growing consumer/regulatory pressure

**Model Answer:**

*Conventional viticulture permits synthetic pesticides, herbicides, and fertilisers without restriction, though many producers now adopt Integrated Pest Management (IPM) to reduce chemical inputs. Organic viticulture prohibits all synthetic chemicals, relying instead on copper-based fungicides (within regulated limits), sulphur, and natural composts. EU organic certification (since 2012) also covers winemaking, with limits on SO2 additions. Biodynamic viticulture encompasses all organic restrictions and adds distinctive practices derived from Rudolf Steiner: specific preparations (horn manure 500, horn silica 501, compost preparations 502-508), adherence to a lunar/astronomical calendar for vineyard work, and a philosophical commitment to treating the farm as a closed, self-sustaining organism. Certification is through Demeter or Biodyvin. Sustainable viticulture takes a broader view, addressing environmental stewardship, social responsibility, and economic viability. Programmes like SWNZ and HVE set measurable targets across biodiversity, water management, energy use, and community engagement. They may permit limited synthetic inputs and are generally more flexible than organic or biodynamic standards. Each approach represents a different point on the spectrum from conventional to holistic farming.*

**54. Compare and contrast the effects of cool and warm climates on grape ripening, wine style, and the viticultural challenges each presents. Give specific examples of regions.**

*(4 marks)*

**Marking Points:**

- Cool climates (e.g., Chablis, Mosel, Champagne): longer growing season, higher retained acidity, lower potential alcohol, lighter body; viticultural challenges include frost risk, insufficient ripening, and fungal disease pressure from humidity
- Warm climates (e.g., Barossa Valley, Napa Valley, southern Rhone): shorter ripening period, higher sugar accumulation, lower acidity, fuller body and higher alcohol; challenges include excessive heat stress, sunburn, water scarcity, and potential loss of aromatic complexity
- Diurnal temperature variation is critical in both: cool nights in warm climates (e.g., high-altitude Mendoza) preserve acidity; warm days in cool climates are needed for adequate ripening
- Climate change is blurring these categories, with traditionally cool regions (Burgundy, Champagne) experiencing warmer vintages and warm regions exploring higher altitudes and cooler sites

**Model Answer:**

*Cool climates such as Chablis, the Mosel, and Champagne have longer growing seasons where grapes struggle to achieve full ripeness. Wines retain high acidity and tend toward lighter body with lower alcohol. Viticultural challenges include spring frost, insufficient ripening in poor vintages, and fungal diseases (downy mildew, botrytis) due to cool, humid conditions. Warm climates like the Barossa Valley, Napa Valley, and the southern Rhone produce grapes that ripen quickly with high sugar levels, yielding fuller-bodied wines with higher alcohol but lower natural acidity. Challenges include heat stress, sunburn, water scarcity requiring irrigation, and potential loss of varietal aromatics. In both climate types, diurnal temperature variation plays a crucial role: in warm regions like high-altitude Mendoza, cool nights preserve acidity and aromatic freshness. Climate change is increasingly affecting both categories, with cool-climate regions experiencing warmer conditions and warm-climate producers seeking higher altitudes or cooler exposures.*