UNIVERSITY OF CALGARY

Smritiraag for String Sextet

by

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A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF MUSIC

DEPARTMENT OF MUSIC

CALGARY, ALBERTA
SEPTEMBER, 2005

UNIVERSITY OF CALGARY

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommended to the Faculty of Graduate Studies for acceptance, a thesis entitled "*Smritiraag* for String Sextet" submitted by Sonya Guha-Thakurta in partial fulfillment of the requirements for the degree of Master of Music in Composition.

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ABSTRACT

Smritiraag is a string sextet of approximately fourteen minutes' duration written for two violins, two violas, and two cellos. The piece combines elements of North Indian classical music with elements of Western contemporary music. Modes, drone, ornaments, and rhythmic cycles from North Indian classical music are combined with Western melodic, harmonic, and rhythmic compositional techniques. The single-movement form makes reference to the form of a *raga* performance. The score is preceded by an essay that discusses the musical vocabulary contained in the work.

ACKNOWLEDGEMENTS

Heartfelt gratitude to
Professor Allan Bell
for his patient encouragement,
steady guidance,
and generosity of spirit.

Many thanks to
Dr. David Eagle
for his assistance.

A warm thank you to
Andrea Davison
for her editing
and suggestions.

DEDICATION

To Mor and Baba
who always encouraged me.

To José, whose
support and understanding
make everything possible.

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I. Introduction

For the title of this composition, I invented the compound word *Smritiraag* in order to encapsulate some of the ideas that influenced the creation of this piece. The word can be translated as both "Colours of Memory" and "Music of Memory." Therefore, it contains the essential ideas that provided an impetus to my creative process: the intangible qualities of memory and the way music can "colour" the mind of the listener. Because the composition is partly inspired by North Indian classical music as well as my memories of visiting India, it seemed appropriate to use my father's language, Bengali. The word *smritiraag* is made up of the two Bengali words, *smriti* (pronounced with a silent "m") and *raag*. *Smriti* means memory or memories. *Raag* or *raga* is commonly used to mean music or song. According to Vaidyanathan, "Raga is the most unique feature of Indian music, so that [*raga* and music] have become almost synonymous today."[1] However, the word *raag,* like many Bengali words, has its origins in Sanskrit, and its "etymological meaning ... is colour."[2]

I have listened to North Indian classical music all my life, and elements from this music have influenced my voice as a composer. In this piece, I made a more conscious investigation into North Indian classical music as a starting point for my creative research. I was struck by memories of visiting India during monsoon season and I was interested in creating two musical languages to reflect the extremes of climate in my experience of two landscapes: monsoon India juxtaposed with the Canadian Rocky Mountains in winter. During the composition process, the metaphor of "warm" and "cold" music provided a starting point, although the music developed beyond the clear delineation into two categories.

II. Research: North Indian classical music

The most important features of North Indian (or Hindustani) classical music are *raga* and *tala*. Simply stated, *raga* generates the pitch material of a piece and *tala* the rhythmic material. Discussion of *raga* must include discussion of: the drone, which

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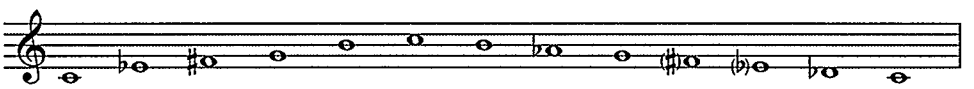
[1] Anant Vaidyanathan, *The Language of Indian Art Music* (Toronto: Raag-Mala Music Society, 1991), 59.
[2] Ibid.

presents the essential notes of the mode; *sruti,* microtonal shading or inflection; and ornaments, which help define the characteristics of a *raga*. Another aspect of Hindustani music that influenced the composition of *Smritiraag* is the form of a *raga* in performance.

The word *raga* can be used generally to indicate the genre of an individual piece. When used specifically, *raga* describes the source for all melodic content of Indian classical music. The notes of a *raga* are "identified... as solfa syllables Sa Re Ga Ma Pa Dha Ni, corresponding to Doh Re Mi Fa So La Ti of the Western system."[3] Of these, Re, Ga, Dha and Ni may be lowered (Re) and Ma may be raised ($\overline{\text{Ma}}$). Normally, there are heptatonic and pentatonic *raga* scales; the hexatonic scales are "invariably derived from heptatonic scales."[4] Each *raga* is a pre-composed melodic framework for improvisation, including certain guidelines and restrictions that help define its distinct character. A *raga*, then, is "not a melody, but a melodic matrix"[5] that provides not only a collection of pitches like a scale or mode, but also patterns of movement between these pitches. For example, a *raga* may omit certain notes when ascending (*Arohi*) and include them when descending (*Avarohi*). The Hindustani *Raga Multani*, based on the scale *Todi* (Fig. 4), has an ascent-descent pattern that omits Re and Dha in the ascent (Fig. 1).[6] In practice, this means Re (or Dha) must always be followed by a lower note: Ga-Re-Sa and Sa-Re-Sa are both correct.

Figure 1: *Raga Multani* ascent-descent pattern



The elements of drone, *sruti,* and ornaments are essential to the character of each particular *raga*. The drone is traditionally performed by tanpura (also called tambura), a plucked stringed instrument with four very resonant strings. As Vaidyanathan notes, "At the extreme, the strumming action becomes inaudible for all practical purposes and only the combined vibrations of the four strings can be heard clearly."[7] Vocalists or instrumental soloists choose the tonic that best suits their tessitura, and the tanpura will be tuned to that

[3] Ibid., 15.
[4] Wim Van Der Meer, *Hindustani Music in the 20th Century* (The Hague: Martinus Nijhoff Publishers, 1980), 11.
[5] Vaidyanathan, 60.
[6] Ibid., 23. The approximate transcription to Western notation in all examples is my own.
[7] Ibid., 79.

"key." The first string is most commonly tuned to the fifth note of the *raga* scale (Pa) with the two middle strings tuned to the upper tonic (Sa′) and the fourth string tuned to the lower tonic.[8] This drone begins before the melodic soloist and continues throughout the *raga*.

Microtonal adjustments, or *srutis,* add to the identity and expressive power of each *raga*. Indian music uses just tuning. This necessitates different tunings for the same note depending on its context. Meer presents a detailed example:

> The ni of Miyan ki Malhara ... is known to be very low[39] but its meaning should be understood in the totality of the phrase p n̲ d n̲ d n — s′. This movement is an entity, and even writing it in notation distracts from the issue, as the notes are shown separately. The n̲i never appears independently, certainly not as a fixed pitch ratio. The student does not try to grasp the pitch of this note but tries to understand how the whole passage should sound. The minute difference in intonation is known as *sruti*.

[39]Vide note 55.

[55]B.C. Deva, [Psychoacoustics of Music and Speech], p.53. Many musicians however deny the harmonic seventh in a *tanpura* and most likely it plays no role in their intonation, at least not consciously. When Miyan ki Malhara was taught to me I felt the lowest point of n̲i is equal to the harmonic seventh. [9]

The purely-tuned octave and perfect fifth above the tonic are absolute intervals in North Indian music. Intervals of thirds, however, must be context dependent: G̲a is not an absolute interval above Sa; rather, the tuning depends on the *raga* and on the melodic approach. Students learn which tuning of a note is most desirable in a given context by listening to and repeating after a master performer or teacher.

Ornaments of many descriptions play an important role in defining the identity of each *raga*. However, the three most important ornaments are *kana, minda,* and *andolita.*[10] *Kana* is a very brief note, like a grace note, either preceding another note or connecting two notes; *minda* is a gradual transition from one note to another, like a glissando.[11] *Andolita* or *andolan* literally means "swaying," and it occurs on a long note. "The note sways either downward or upward, touching the adjacent note."[12] In the same way that a *raga* may

[8] For discussion of other notes used in the drone, consult Meer, 18 and 34.
[9] Meer, 10 and 19.
[10] Meer, 21.
[11] Ibid.
[12] Vaidyanathan, 25.

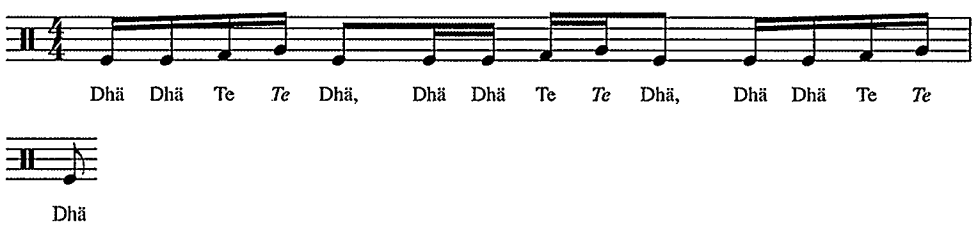
have a particular ascent-descent pattern that omits notes in one direction, a *raga* may also have a pattern requiring particular ornaments in certain contexts of note movement or duration.

Tala is a rhythmic cycle, a pattern of beats that continuously repeats. The beats of a *tala* are learned orally and memorized as recited syllables. Beyond the beats, rhythms or pulses of a *tala,* each syllable, or *bol,* has an expressive tonal quality, corresponding to the different pitches a tabla can produce. As the *raga* is a framework for melodic improvisation, so the *tala* is a framework for rhythmic improvisation. Normally each *raga* performance will use one *tala* from its entrance to the end of the piece.[13] The first beat of the *tala* is called *sam* and any important structural downbeat will fall on it. Even in elaborate improvisations, the performer must keep count in order to mark *sam* at its return. The realization of a *tala* can involve isorhythms and complex syncopations that ultimately lead back to *sam.* This return to the beginning of the cycle is a recognizable feature of the *tala* system and is often emphasized by the use of a *tihai,* a short rhythmic pattern – usually syncopating the main *tala* beats – that repeats three times. On the final repetition, the last beat of the *tihai* falls on *sam,* the first beat of the next repetition of the *tala,* making a decisive rhythmic cadence (Fig. 2).

Figure 2: *Tihai* against four beats[14]

Beats	1				2				3				4			
Bols	Dhä	Dhä	Te	*Te*	Dhä,	—	Dhä	Dhä	Te	*Te*	Dhä,	—	Dhä	Dhä	Te	*Te*
	+															
	Dhä															

Note: + is *sam*; — equals one *bol,* or one quarter of a beat



[13] Aloke Dutta, *Tabla - lessons and practice,* 2nd ed. (Austin, Texas: by the author, 1995), 8.
[14] Dutta, 32. See Dutta, 13-18, for pronunciation and performance directions for the *bols*. The transcription to Western notation is my own.

The realization of a raga in performance is traditionally in three sections. *Alap*, the beginning section, involves melody and drone only. It is an introduction to and slow unfolding of the notes and basic melodic patterns of a raga. Generally, the *alap* has an improvisatory character and an unmetred rhythmic profile. The second section, made up of *jod* and the faster *jhala,* introduces a pulse in the melodic instrument.[15] This pulse is reinforced as the tabla enters, introducing the *tala.* There can be animated interplay between the melodic soloist and the tabla player, featuring extended isorhythms and syncopation in both parts – though usually not at the same time. This imitative dialogue builds in intensity, leading to the final section, *gat.* According to Vaidyanathan, "improvisation on the Gat is largely rhythmic improvisation, allowing for a wide variety of complex rhythmic motifs, especially Tihai-s."[16] The soloist and the tabla player often compete to outdo one another with the speed, dexterity and complexity of each successive phrase, imitating and elaborating on each other's material until a breathless climax is reached that signals the end of the *raga.*

III. Musical language: Scales and modes

The pitch material for the harmonic and melodic language of *Smritiraag* is taken from a group of scales and their transpositions: the acoustic scale, the octatonic mode, and *Todi,* a raga-scale (Figs. 3-5). These scales have properties in common that facilitate moving smoothly from one to another or combining melodic material from one scale with harmonic material from another.

The common link between the octatonic mode and acoustic scale is the octatonic tetrachord that appears repeatedly in the octatonic mode and once in the acoustic scale beginning on its fourth note (Fig. 3). There are also several notes in common between *Todi* and the acoustic scale that begins a semitone lower; these common notes form a pentatonic scale (Fig. 4). Exploiting this pentatonic group provides a means to move smoothly from *Todi* material to acoustic material. There are also five notes in common between the octatonic mode and *Todi* scale starting on the same note (Fig. 5).

[15] Vaidyanathan, 46, 54.
[16] Ibid., 54.

Figure 3: Octatonic tetrachords in the acoustic and octatonic scales

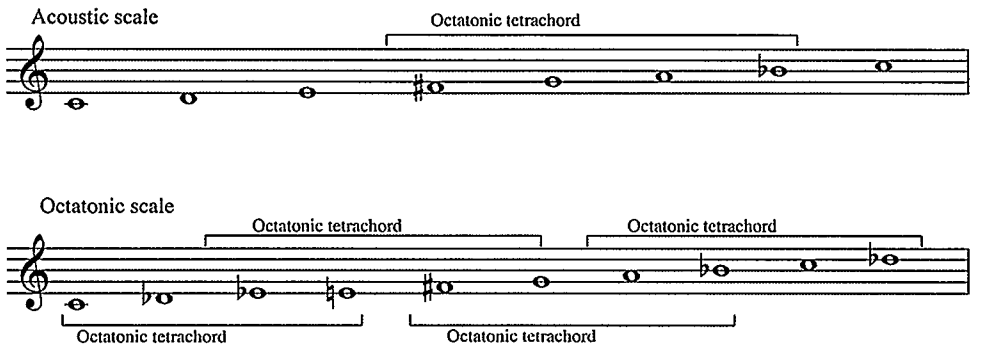


Figure 4: Pentatonic grouping in the *Todi* and acoustic scales

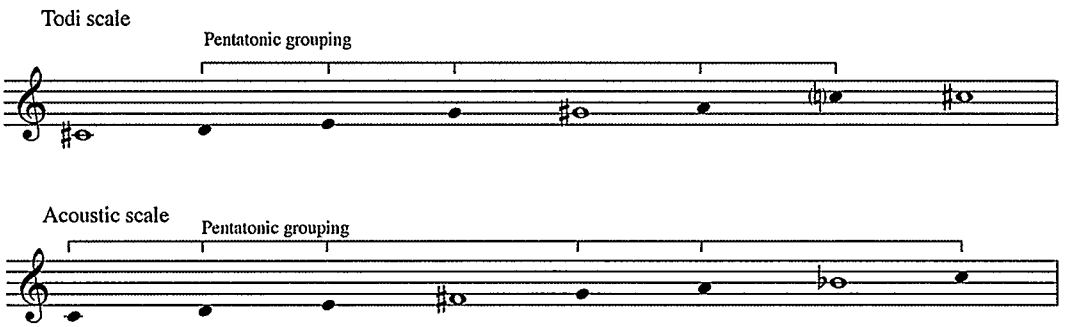
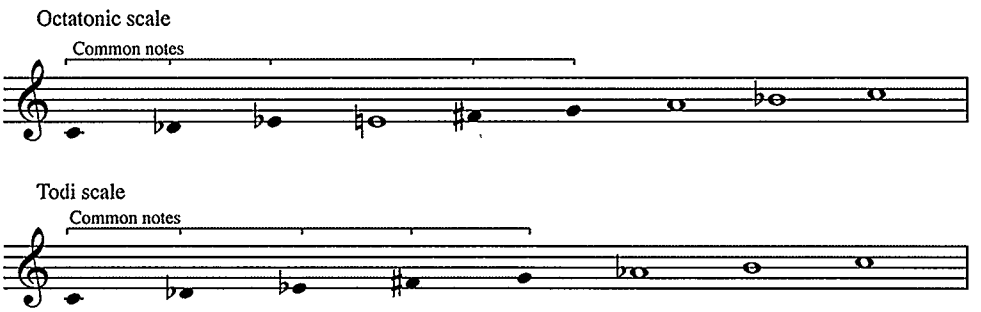


Figure 5: Notes in common from octatonic and *Todi* scales



IV. Form

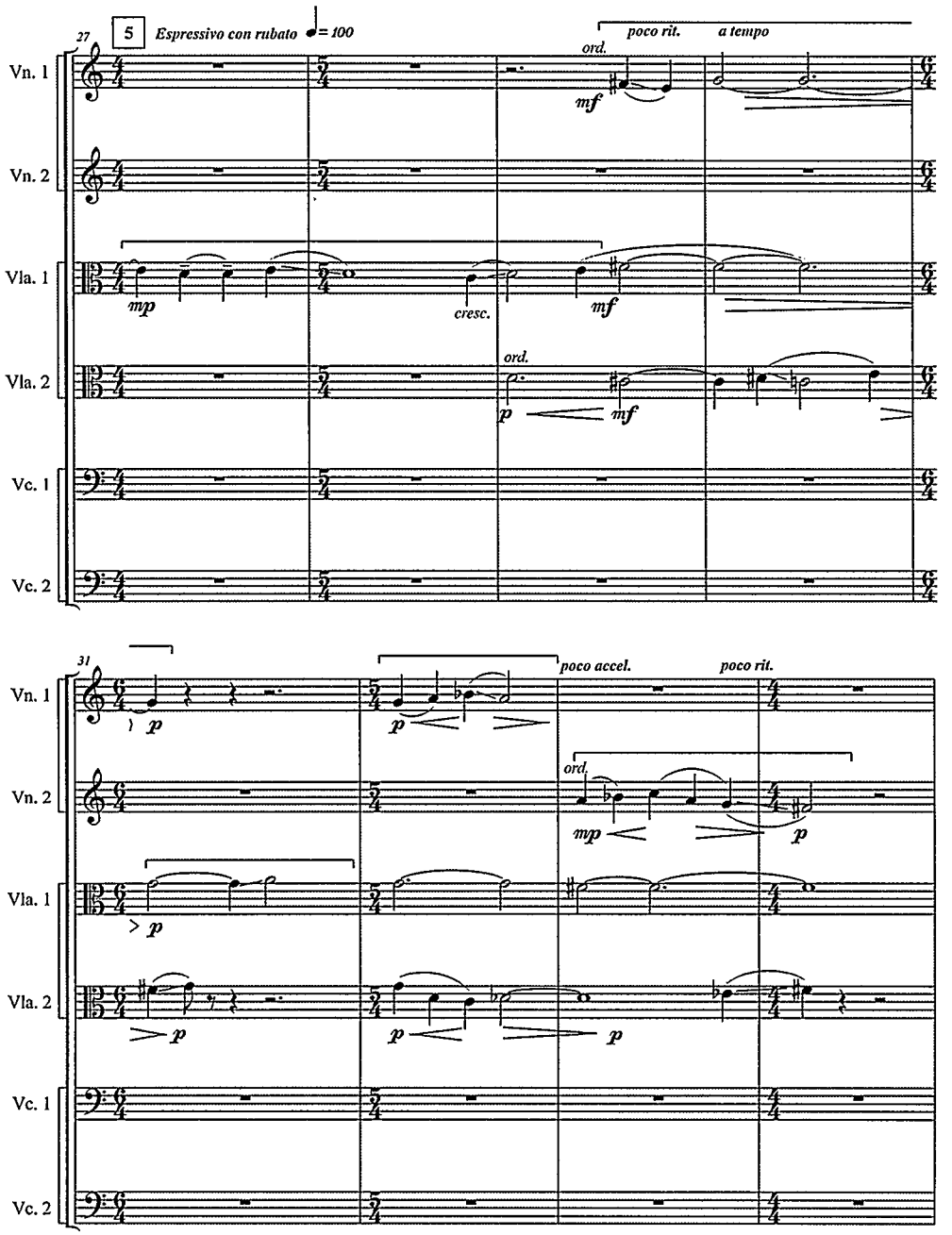
While composing *Smritiraag,* in order to draw upon two musical traditions, I used the metaphor of "warm" and "cold" music to help organize the two different sets of characteristics that arose in the music. Vivid memories of India in monsoon season and the Canadian Rocky Mountains in winter were the initial inspiration for creating contrasting

musical languages. Although this metaphor suggests two completely separate worlds, the music does not hold to absolute boundaries. One organizing concept in *Smritiraag* comes from the juxtaposing and blending of these two musical languages. The other main element that organizes the sections of the piece is the general outline of a *raga,* following the broad tempos and rhythmic shape only. Combining these two concepts generates an episodic form based on the two musical languages interrupting each other and interacting, with underlying references to the sections of a *raga* performance (Appendix A).

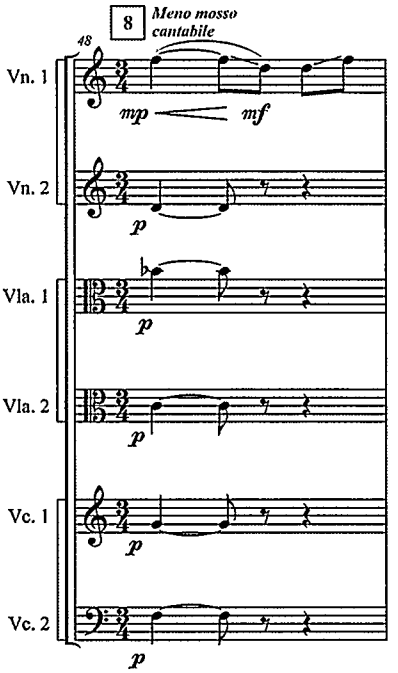
My associations with the "warm" and "cold" climates and landscapes influenced the musical choices I made during the composition of *Smritiraag*. I use resonant timbre and harmony to allude to humidity, blurring in the melody through glissandi and overlapping melody notes to allude to hazy landscapes, and slow melody without a strong sense of pulse to allude to slow physical movement because of heat. To capture my impressions of the "cold," I use *sul pont,* harmonics, and pizzicato timbres to allude to icy, dry conditions; small symmetrical gestures to allude to the symmetry of snowflakes; tremolo textures to allude to shivering; and angular melodies to allude to icicles and jagged peaks of the Rockies.

The "warm" music uses a melodic and harmonic language based mainly on the acoustic scale and *Todi*, with an emphasis on the pentatonic scale it contains. "Warm" melodies are largely stepwise, using major seconds prominently (Ex. 1). Harmony in this music favours tertial, secondal and quintal chords, which often occur at important structural points (Ex. 2). Other features that characterize this "warm" music include the use of glissandi, grace notes decorating long sustained notes, and a languid exploration of low and medium tessituras on each instrument (Ex. 3). The timbres focus on ordinary string colour (without *sul pont*, for example) and *arco* playing. The result is a full and resonant sound.

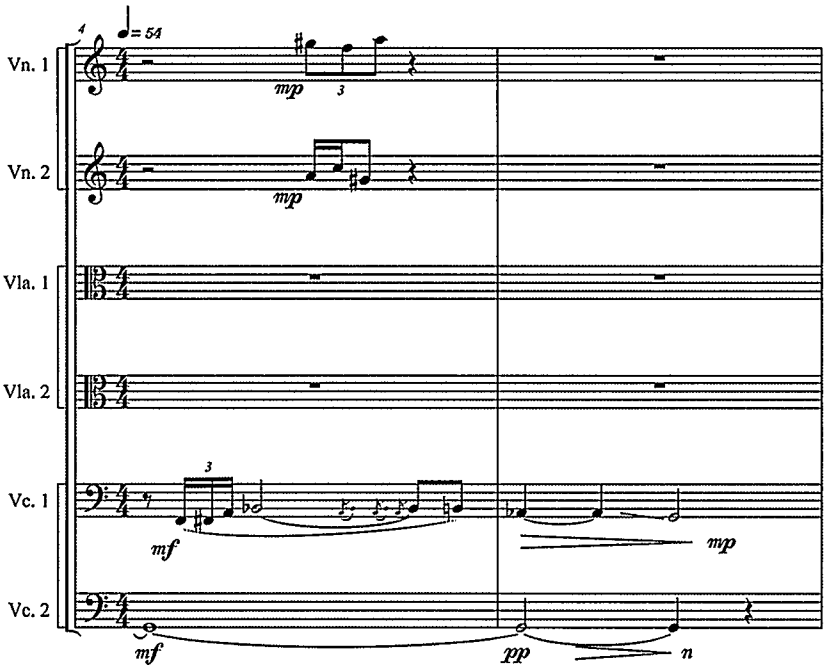
Example 1: Stepwise melody, mm. 27-34



Example 2: Quintal harmony, m. 48



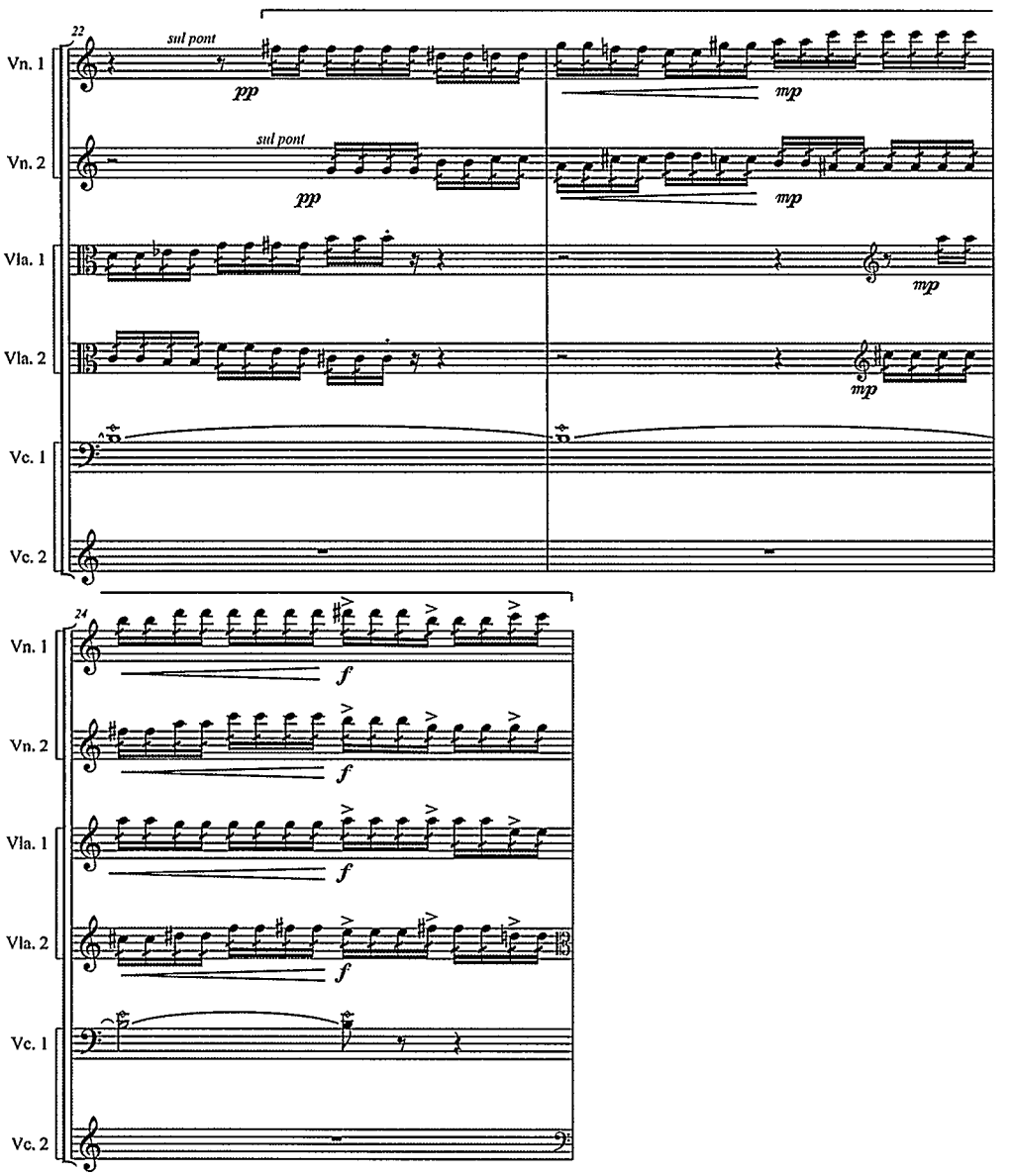
Example 3: Low tessitura melody with glissandi and grace notes, mm. 4-5



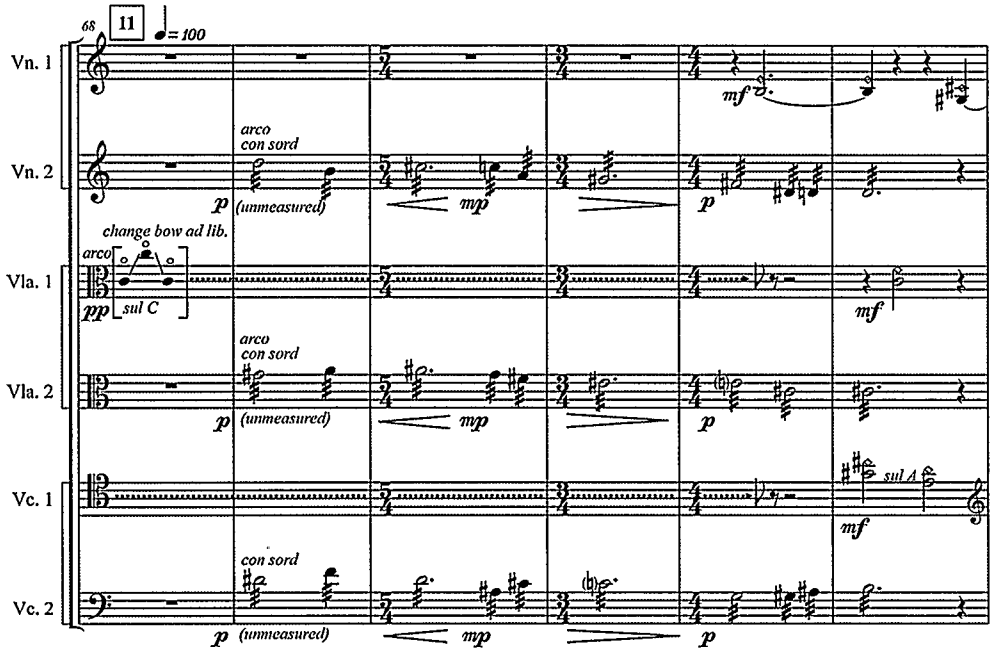
The "cold" music uses mainly the octatonic mode and *Todi,* emphasizing intervals of minor seconds and thirds in the principal lines (Ex. 4). Where I use the acoustic scale in "cold" sections, I focus on the octatonic tetrachord contained within it. Harmonies

are more tense than in the "warm" music, using minor seconds or major sevenths and fourths, often in closely voiced chords (Ex. 5). The music is less overtly melodic and the lines are more angular. Symmetry in small gestures is also a recurring feature (Ex. 6). The instrumental colours of *sul ponticello* and muted playing are paired with tremolo textures. Use of pizzicato, harmonics and high-register playing also help to define this "icy" character (Exs. 4 to 6).

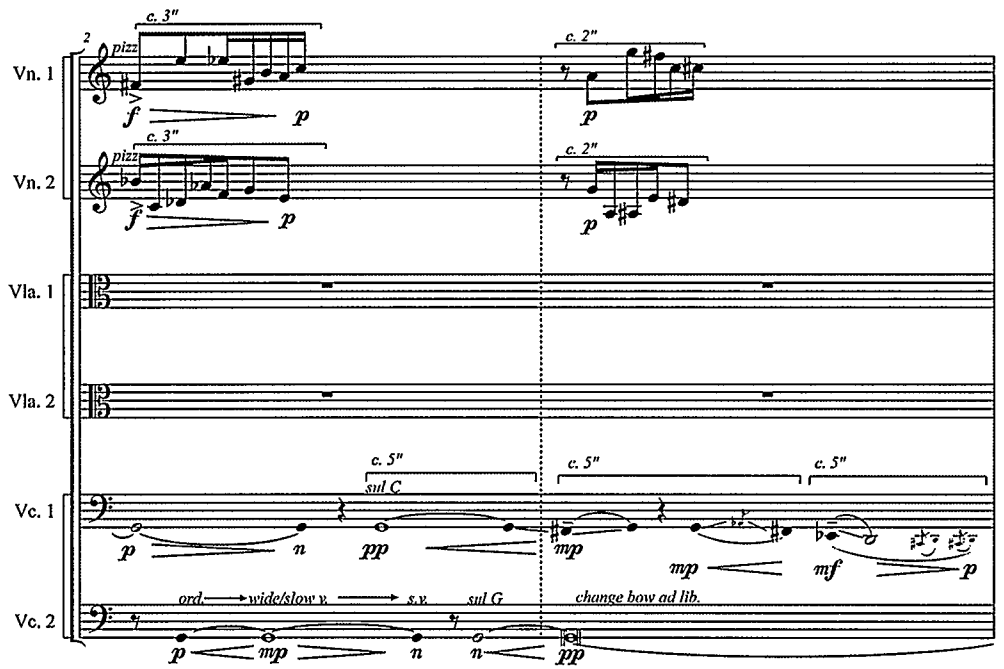
Example 4: Melody line emphasizing minor seconds and thirds; high register, *sul ponticello,* tremolo and harmonics, mm. 22-24

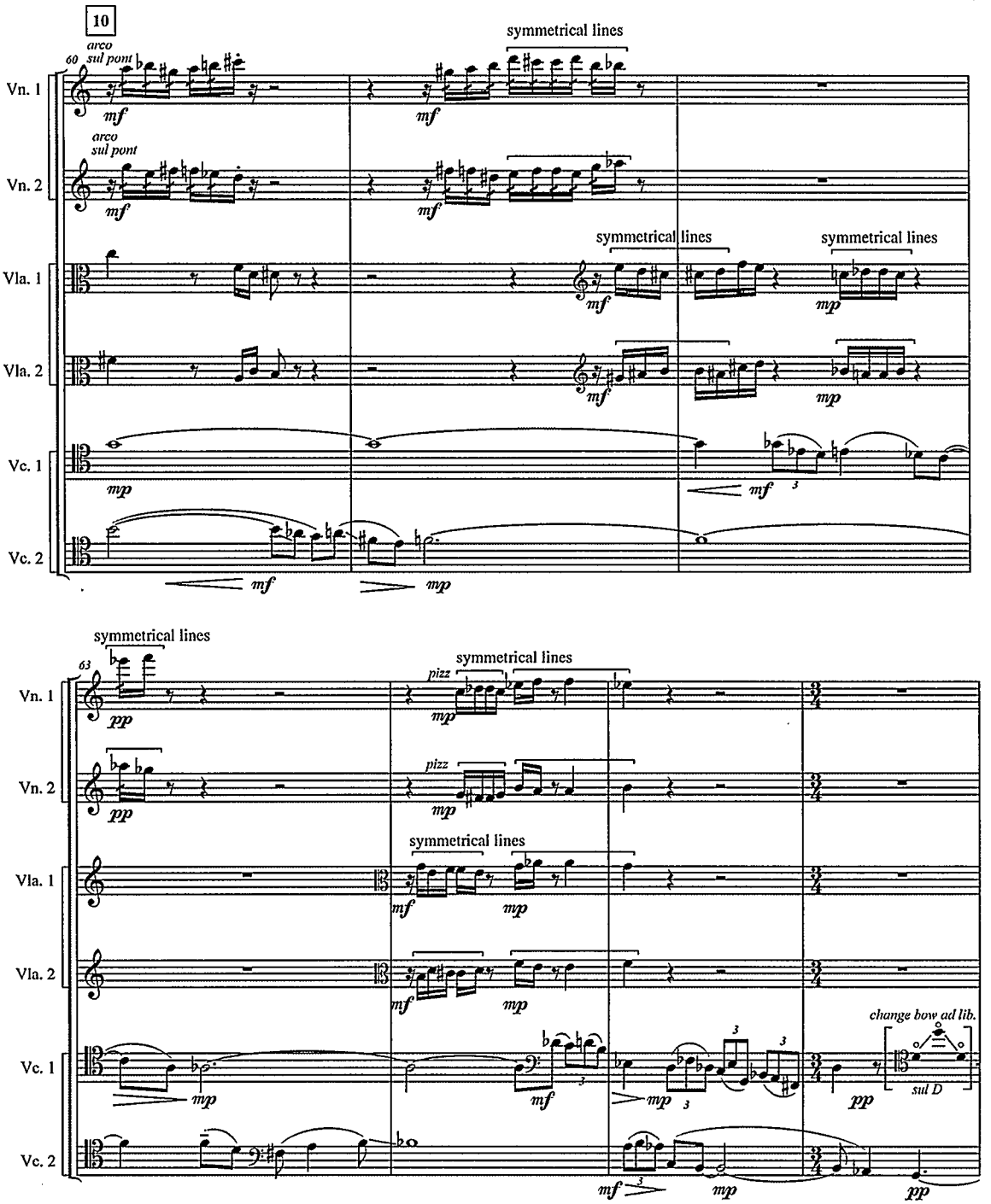


Example 5: "Cold" harmony, closely voiced; muted tremolo and harmonics mm. 68-73



Example 6: Symmetrical pairs of lines; pizzicato and high-register *sul ponticello* tremolo, mm. 2-3 and mm. 60-66



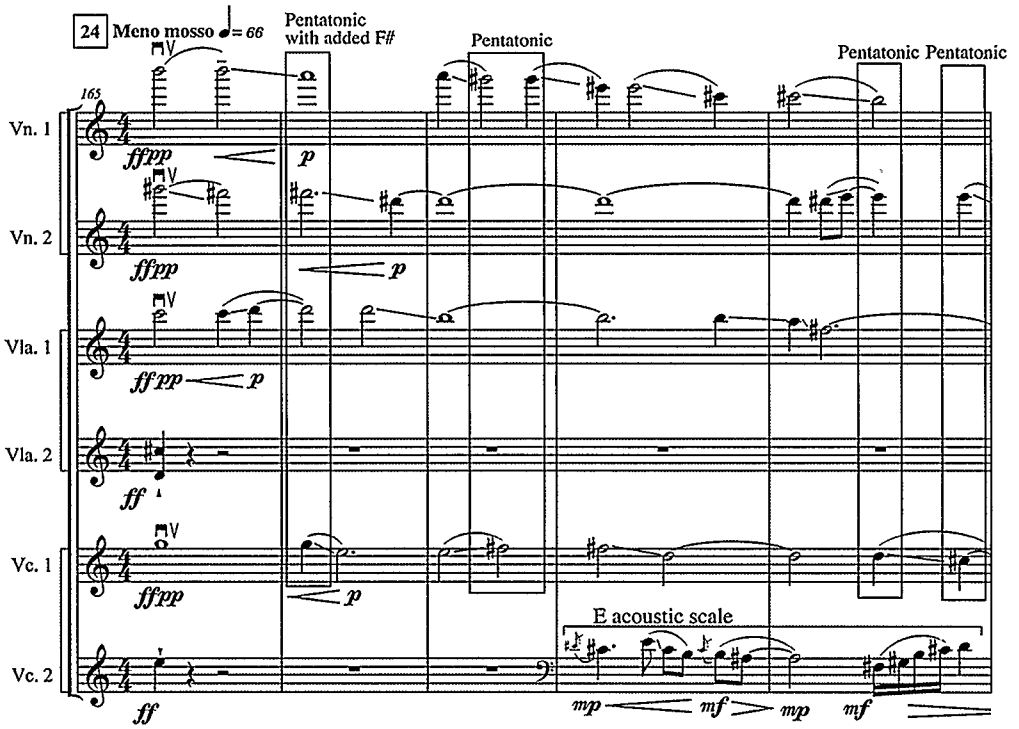


Smritiraag has two main sections (Appendix A). In the first section, the "warm" and "cold" musics are mainly juxtaposed or alternated. Although heard simultaneously, the "warm" cello lines in mm. 2 to 3 do not blend homogeneously with the jagged pizzicato violin parts. A similar juxtaposition of contrasting musical layers occurs in mm. 60 to 66, with cellos continuing a slow descent to complete their "warm" phrase while violins and

violas present unrelated "cold" music above (Ex. 6). In other parts of the first section, "cold" and "warm" music interrupt each other and alternate. An example is the "cold" music from rehearsal (R) 4 to R 5 followed by the "warm" music from R 5 to R 8 (Appendix C).

In the second large section of *Smritiraag*, the two musical languages become increasingly blended. From R 24 to the end, elements of each contribute to the whole. For example, while the extreme high register at R 24 would normally be associated with the "cold" music, this section also includes glissandi, solo lines using notes from the acoustic scale and pentatonic harmony, all elements normally associated with the "warm" music (Ex. 7).

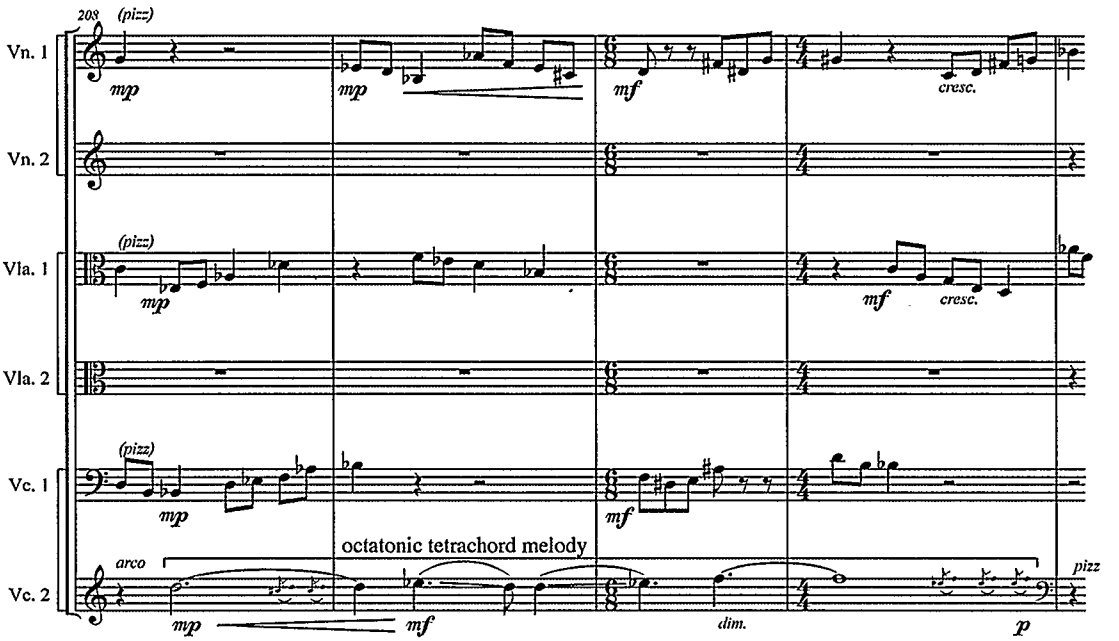
Example 7: Blending "cold" and "warm": high register with glissandi and acoustic-scale melody, mm. 165-169



Another instance of music that blends elements from both musical languages occurs in mm. 208 to 212. The melody in the second cello has the contour and ornaments of a "warm" melody, yet the pitch material, drawn from the octatonic tetrachord, is characteristic of the "cold" music. In the background the first violin, viola and cello provide pizzicato

accompaniment using notes from the *Todi* scale. Because the emphasis is on pentatonic melodic movement this suggests "warm" music, however the pizzicato timbre is strongly identified with "cold" music in the first section of the piece. Therefore, the two different musical landscapes can no longer be separately identified, and a new, blended musical language is evident (Ex. 8).

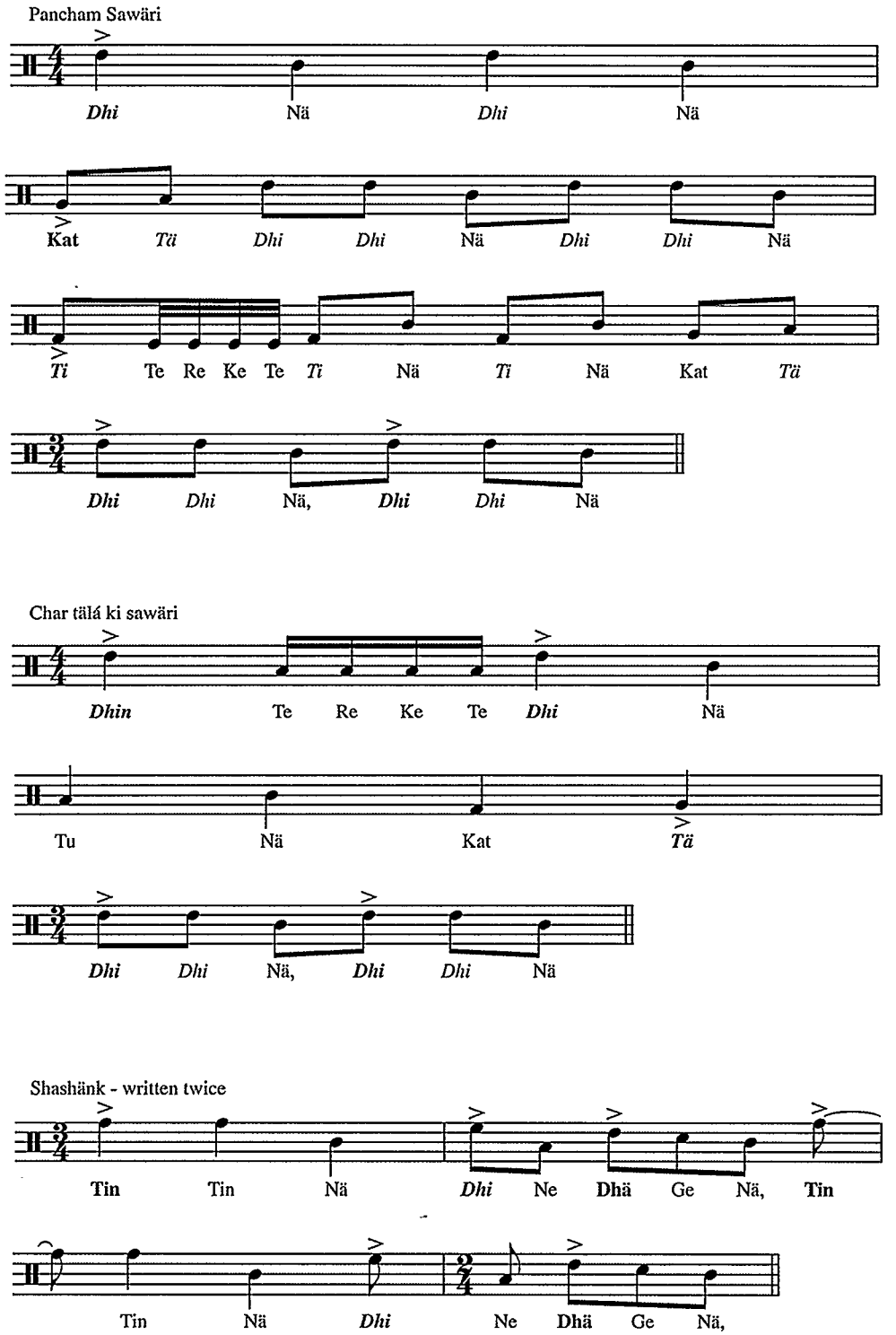
Example 8: Blending "warm" and "cold": slow melody with glissandi and ornaments, using notes from the octatonic tetrachord; pizzicato accompaniment using pentatonic and *Todi* scales, mm. 208-212



V. Rhythmic organization and *tala*

Smritiraag uses rhythmic cycles or *talas* in a non-traditional manner. Instead of choosing one *tala* to organize the rhythmic portion of an entire piece, as in the North Indian tradition, I used several *talas* as raw rhythmic material: *Pancham Sawäri, Char tälá ki sawäri* and *Shashänk* (Fig. 6). The accentuation in the last bar of both *Pancham Sawäri* and *Char tälá ki sawäri* creates a syncopation of the main pulse. Therefore, in my usage, these bars appear either as simple time triple-metre measures or as compound time duple-metre measures. The *talas* are used in three main ways: as a framework of time signatures and structural arrival points; as rhythmic accompaniment lines; and as rhythmic cells. These cells appear in different melodic lines, and are subject to developmental processes.

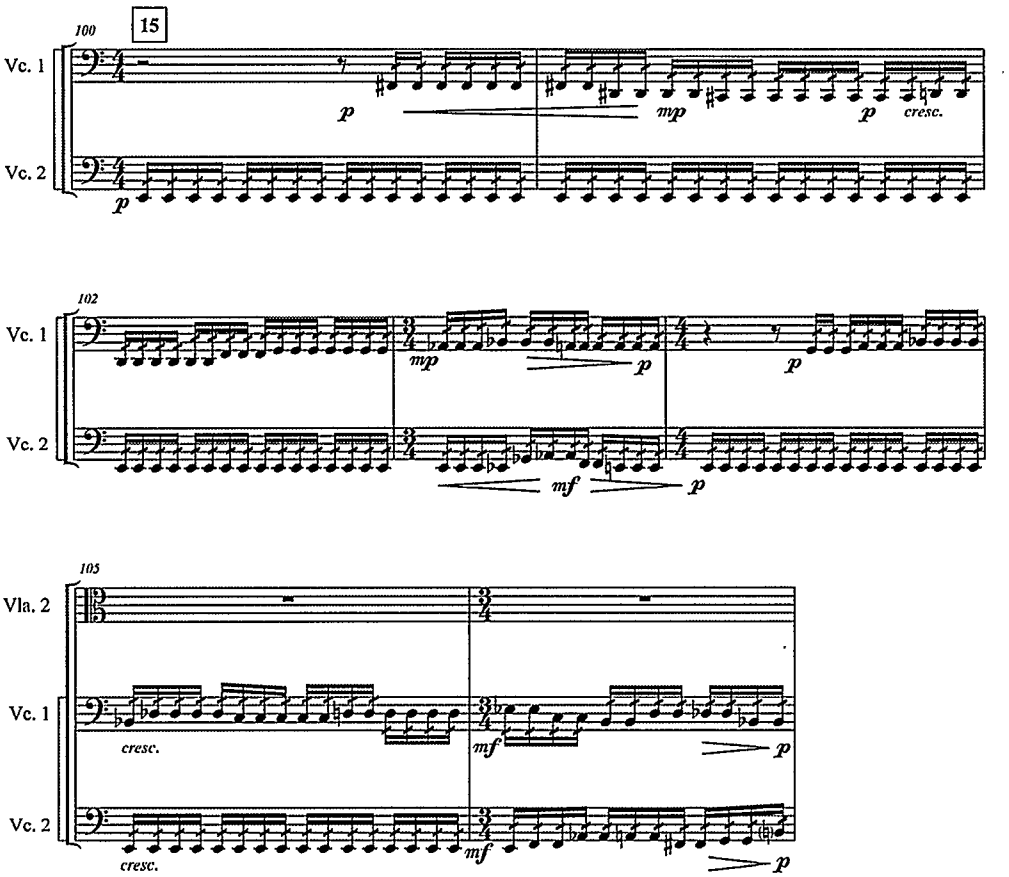
Figure 6: ***Talas Pancham Sawäri, Char tälá ki sawäri*** **and** ***Shashänk*** [17]



[17] Dutta, 23-31. The transcription to Western notation is mine, and only approximately indicates pitch variations for the syllables of each *tala*.

An example of a *tala*-derived framework of time signatures is found in the section from R 15 to R 24 (Appendix C). The rhythmic outline of this section is mainly organized by alternating occurrences of *Pancham Sawäri* and *Char tälá ki sawäri*; the time signatures follow the sequence 4 - 4 - 4 - 3, 4 - 4 - 3 (Ex. 9). Although the underlying rhythmic framework is based on the *talas,* only the main divisions of each *tala* are present. The full rhythmic character of the *talas*, which would need to include accents and pitch variations, is hidden beneath the texture of constant tremolo sixteenth-notes.

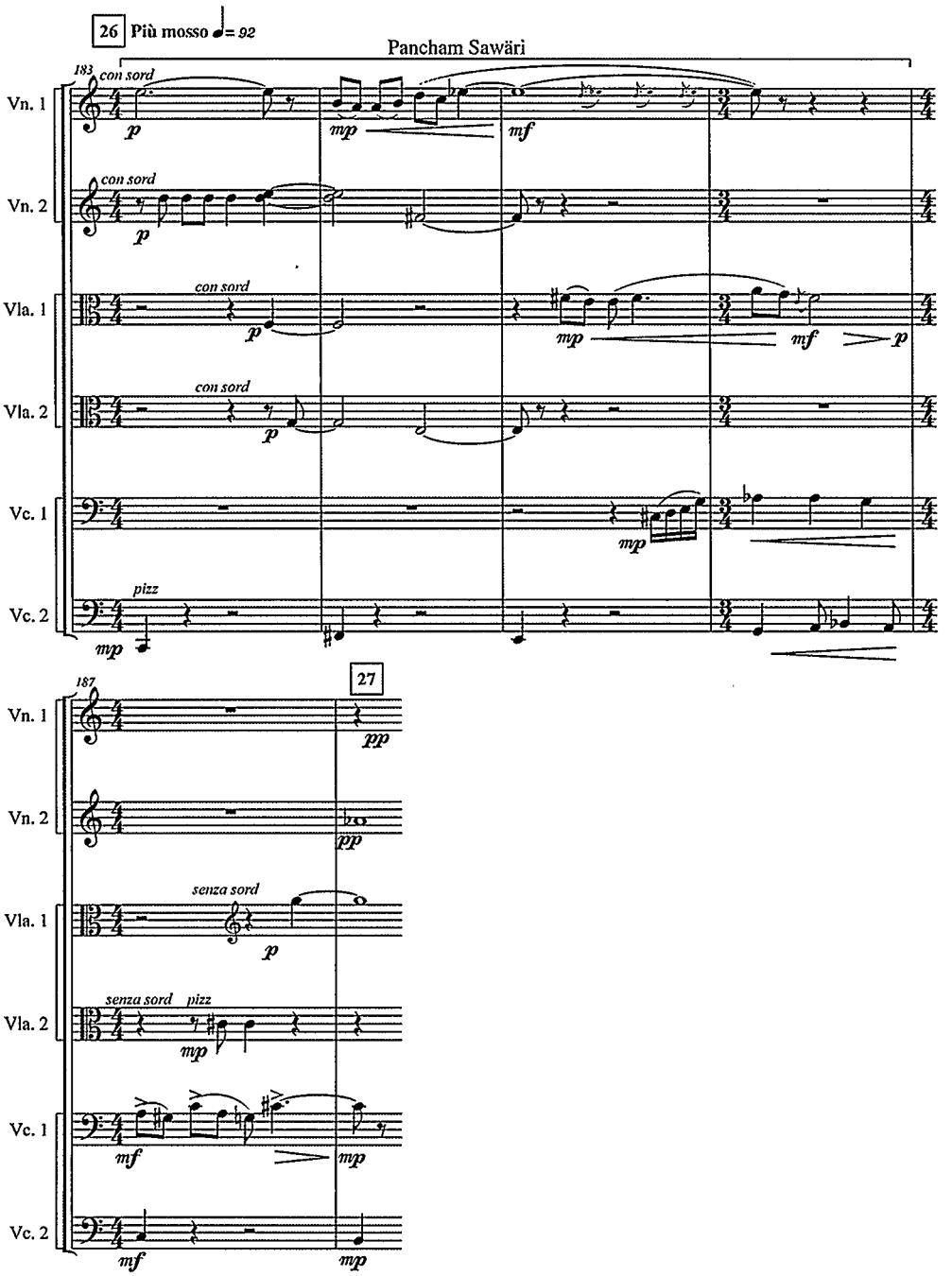
Example 9: *Pancham Sawäri* and *Char tälá ki sawäri* organize the time signatures, mm. 100 to 106



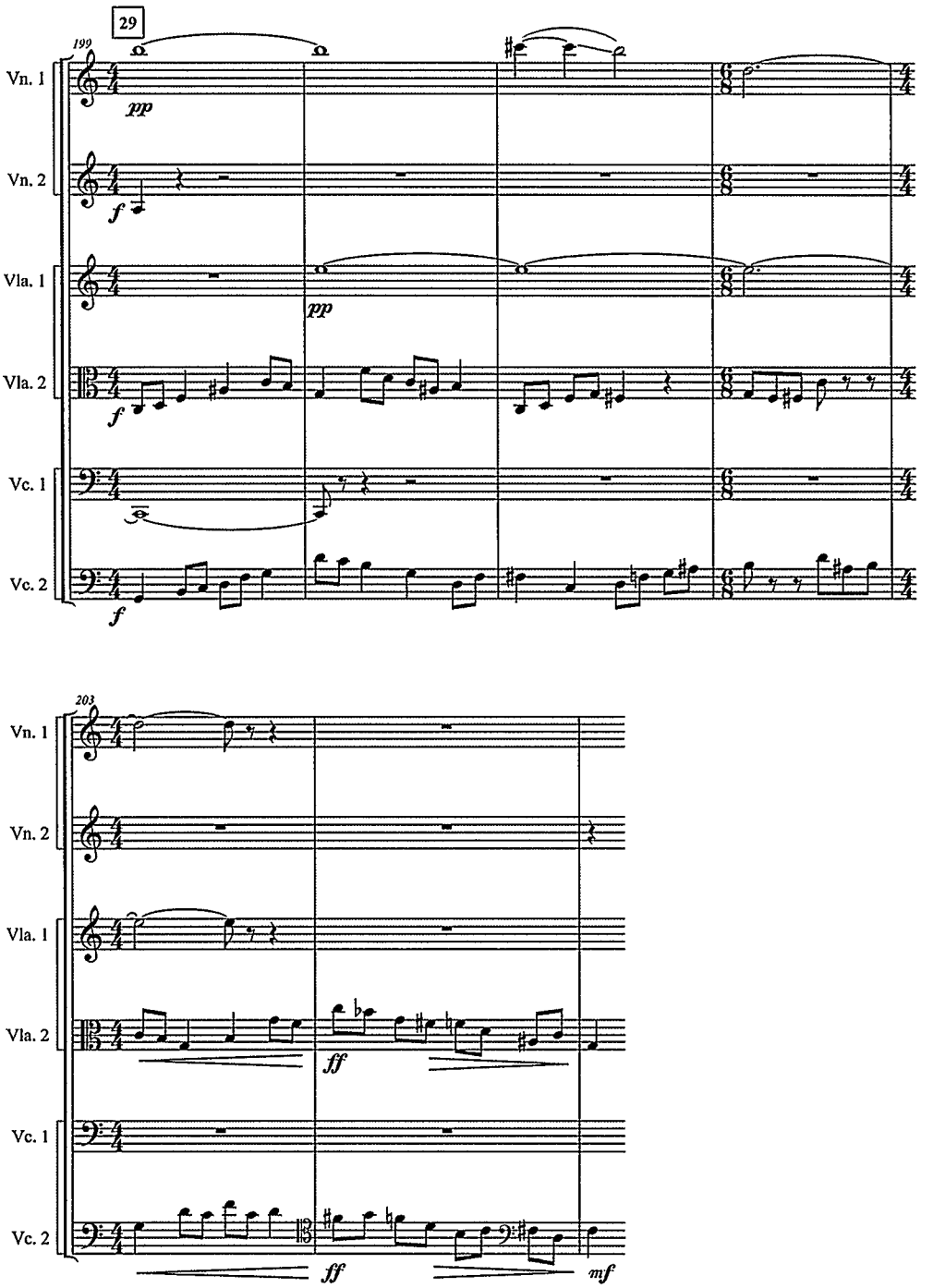
From R 26 to R 31, the rhythmic accompaniment line is based on *Pancham Sawäri*. In the beginning of this section, from m. 183 to m. 186, the *tala* provides a framework of time signatures in the order 4 - 4 - 4 - 3, and the second cello outlines only the downbeats (Ex. 10). This sparse outline develops throughout the section, always presented pizzicato, until at R 29 the rhythmic accompaniment line is fully presented in the second viola and

second cello (Ex. 11). Although the material uses a pattern of time signatures based on the *tala,* the rhythmic phrase that develops has its own character, differing from *Pancham Sawäri* as it would be used in North Indian classical music.

Example 10: Rhythmic framework based on *Pancham Sawäri*, mm. 183-188



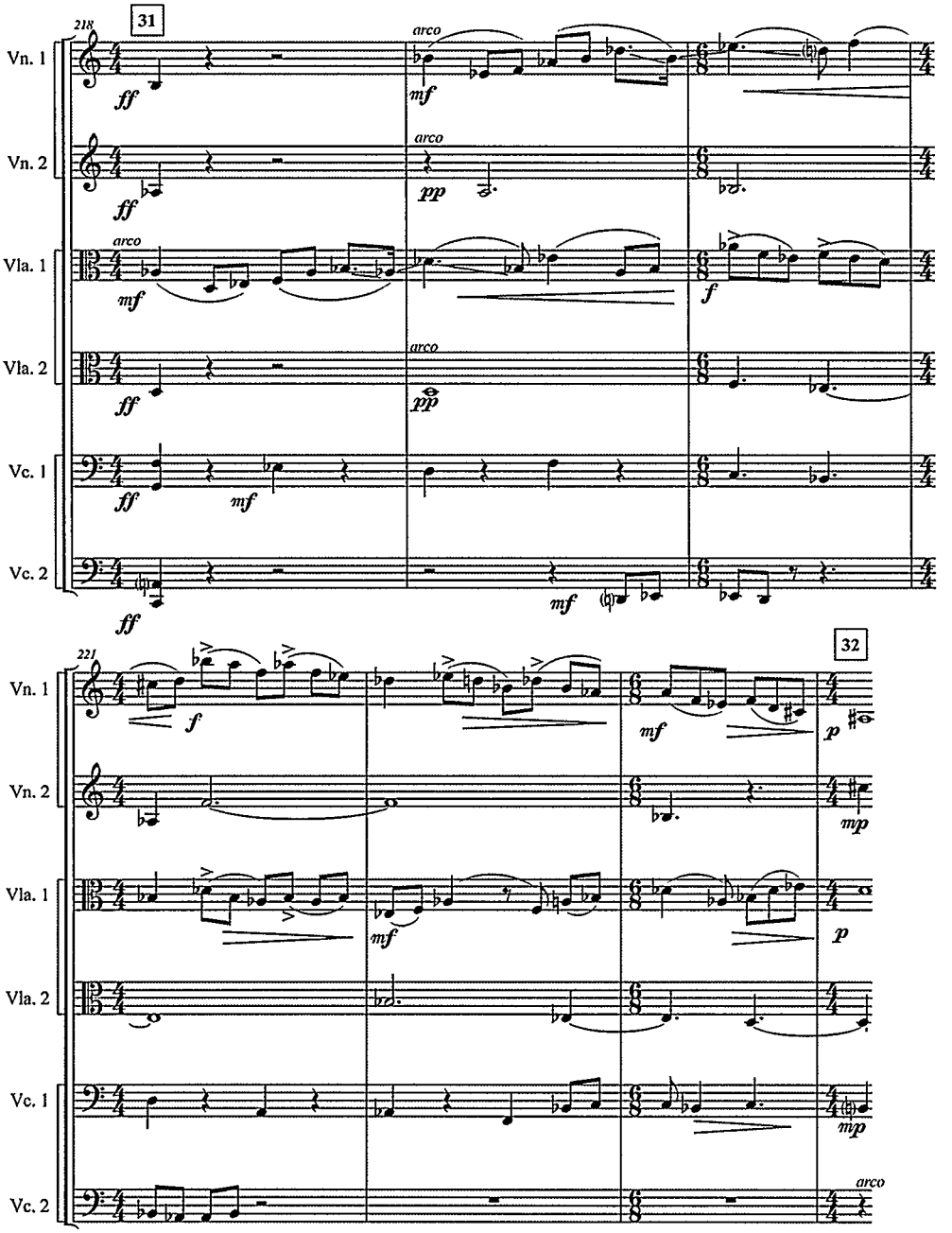
Example 11: Rhythmic accompaniment line fully presented, mm. 199-205



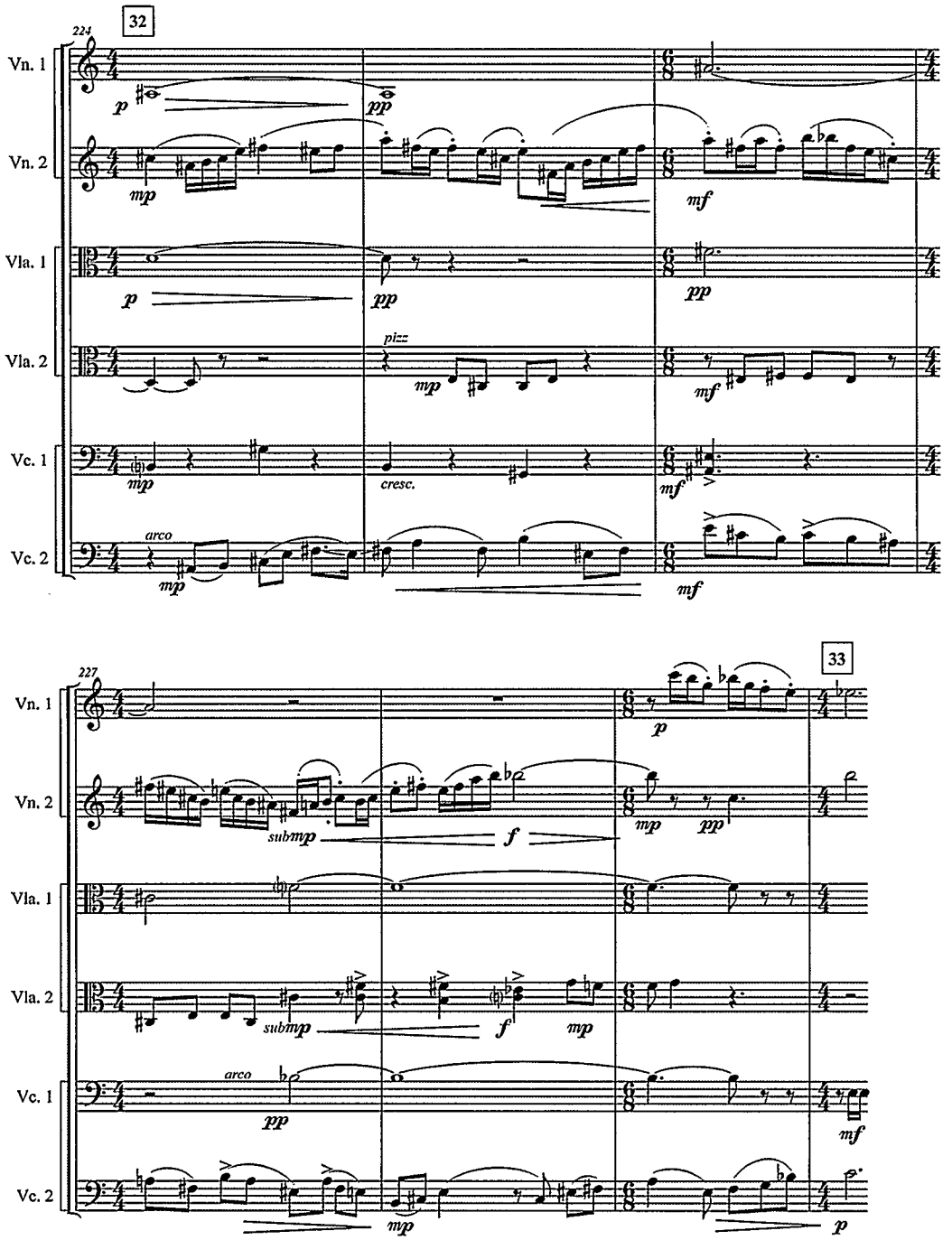
In the section from R 31 to R 37 the rhythmic framework and two main melodic lines are based on the *tala Char tälá ki sawäri* (Ex. 12). In this case, the pizzicato accompaniment helps to emphasize the main beats, but the full rhythmic phrase is presented over two repetitions of the rhythmic cycle in the first viola melody. Another melody based

on *Char tälá ki sawäri* is heard in the second violin at R 32 against the first melody from R 31, now presented in the second cello (Ex. 13).

Example 12: Rhythmic framework and melody based on *Char tälá ki sawäri*, mm. 218-224



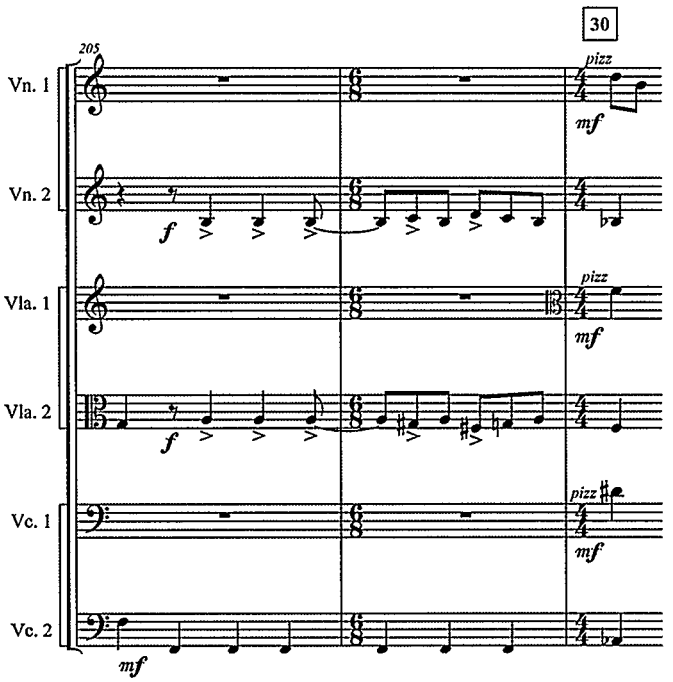
Example 13: Two melodies based on *Char tälá ki sawäri*, mm. 224-230



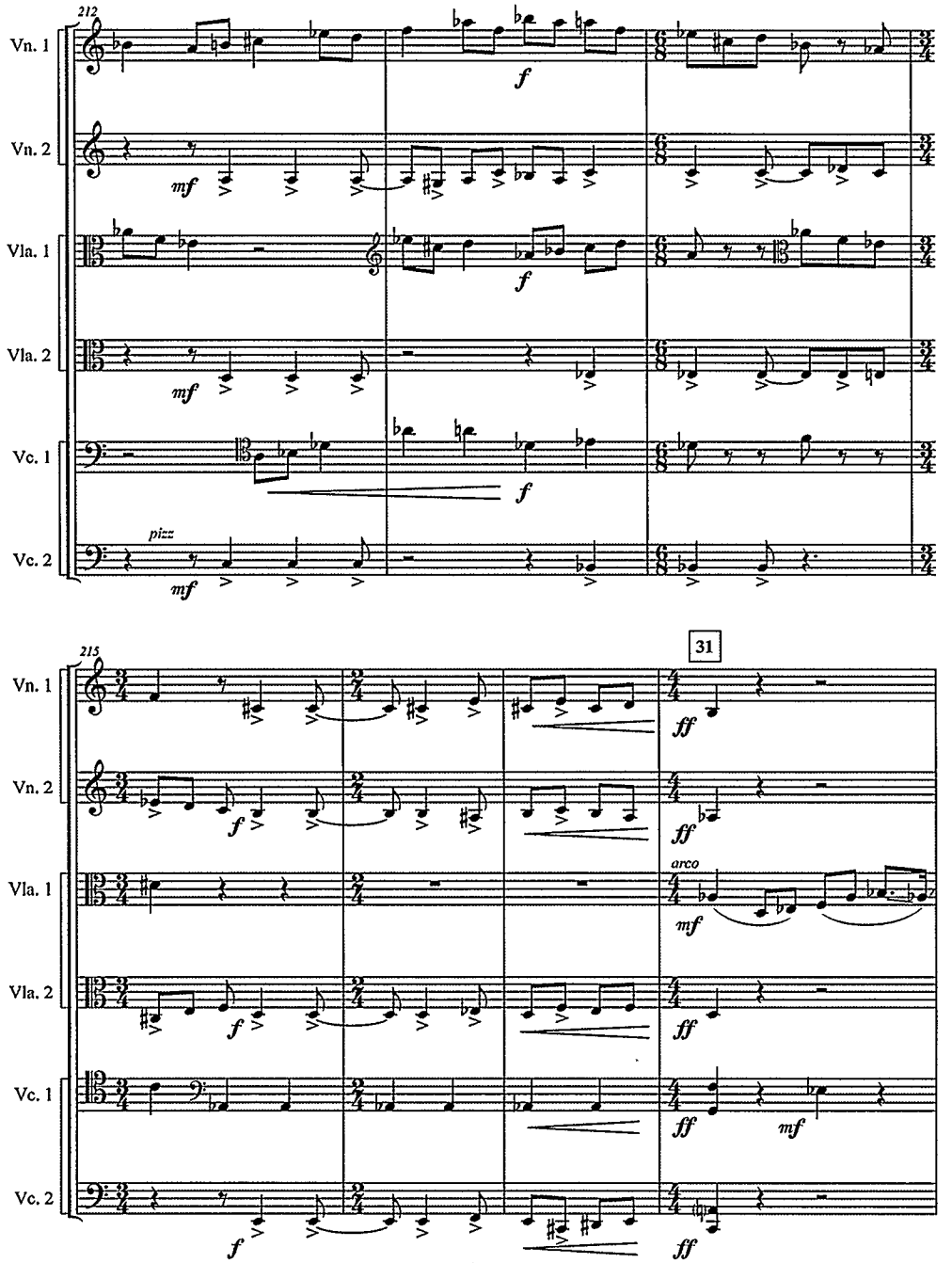
There is an important rhythmic cell based on the *tala Shashänk*. This is presented by the first cello in mm. 185 to 188 (Ex. 10). The next presentation of this cell occurs leading into R 30 as a kind of rhythmic cadence that emphasizes the arrival downbeat (Ex. 14). Each time this rhythm is heard, the instrumentation intensifies the feeling of arrival:

first it is played by one instrument, then by two. The pattern continues leading into R 31. The cell is repeated three times to create a *tihai* played by three, then four instruments (Ex. 15). The same cell is used in the cello lines, repeated three times to create another *tihai,* leading to the final measure of the piece.

Example 14: Rhythmic motif based on *Shashänk,* mm. 205-207



Example 15: *Tihai* based on *Shashänk*, mm. 212-218



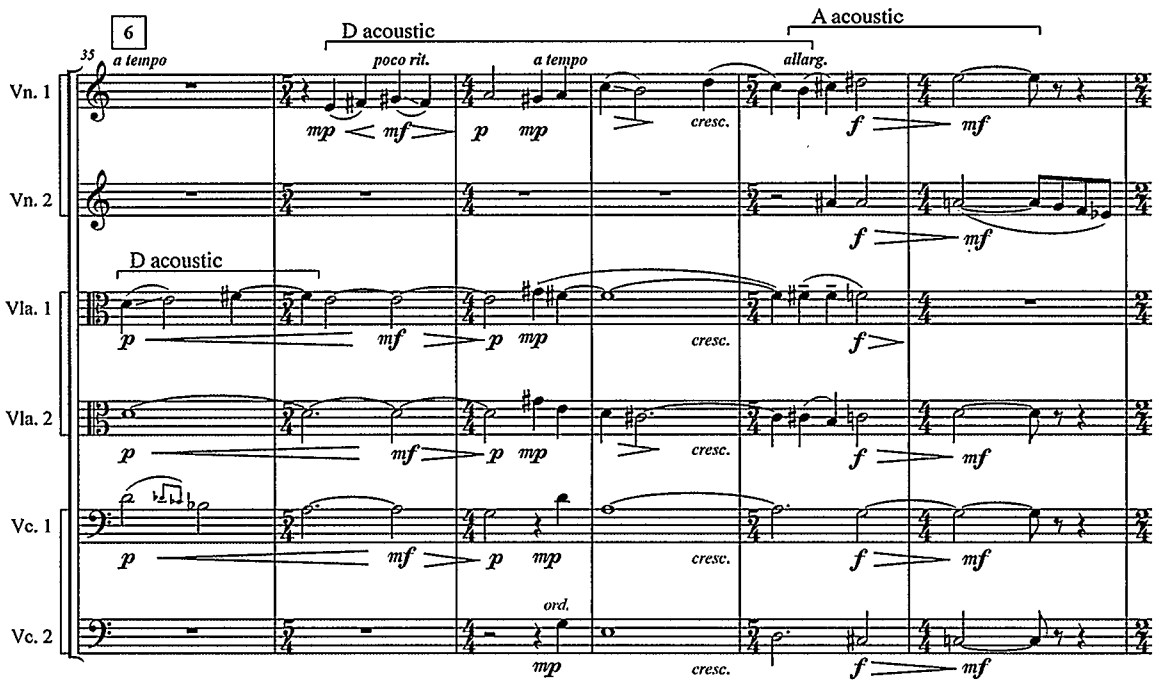
VI. Melody

In North Indian classical music, the continuous melody is the essential focus of a *raga* performance. Because this musical tradition is partly the inspiration for *Smritiraag*, melody plays a central role in my composition. There are melodies in each of the main

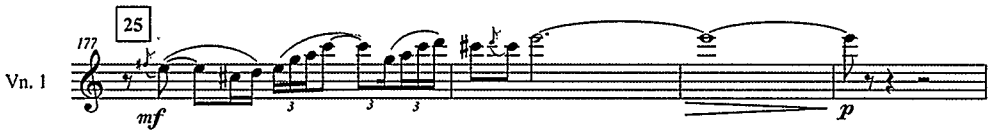
modes, and the contrasting characteristics of the modes help to colour the mood of each section. Common tones are used to move between different modes and between transpositions of the same mode. In some sections, short melodic fragments take on thematic importance. These appear within longer melodies and as accompaniment.

The melody from R 5 to R 6 uses the acoustic scale beginning on C (Ex. 1). At R 6 the mode shifts to D acoustic, with another shift just before R 7 to A acoustic (Ex. 16). These shifts are accomplished through the use of common tones in the melody. These melodies are mostly stepwise, with a focus on the interval of a major second. This characteristic combined with the normal bowed string colour in low to mid-range tessituras defines this section as an example of "warm" music. An example of a melody in *Todi* occurs in the first violin at R 25 (Ex. 17). At R 8, the melody in the first violin is octatonic (Ex. 18).

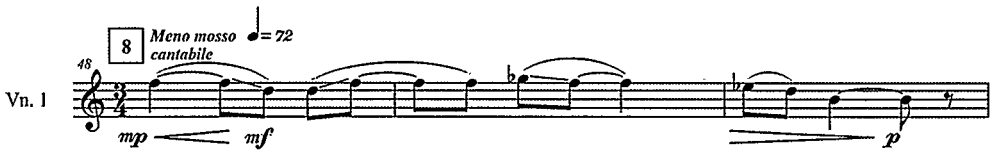
Example 16: Melody based on D and A acoustic scales, mm. 35-40



Example 17: Melody based on C-sharp *Todi*, mm. 177-180

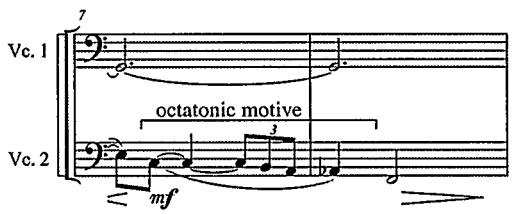


Example 18: Melody based on an octatonic mode, mm. 48-50

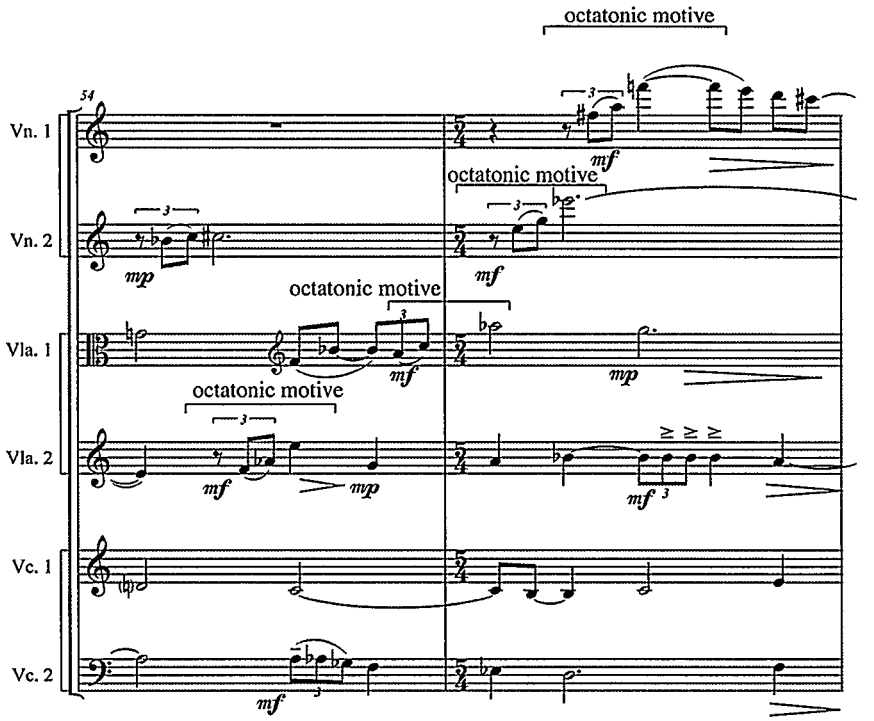


Most of the important melodic motives use notes from the octatonic tetrachord. The main motives include: a stepwise octatonic motive that first appears in descending form (Ex. 19); a stepwise repeated-note motive first heard in m. 27 (Ex. 1); and an upward-leaping motive always heard in a triplet rhythm (Ex. 20). These motives are frequently part of melodic and accompaniment textures and the first two are heard in inversion as often as in their initial form.

Example 19: Melodic motive based on stepwise octatonic tetrachord, mm. 7-8



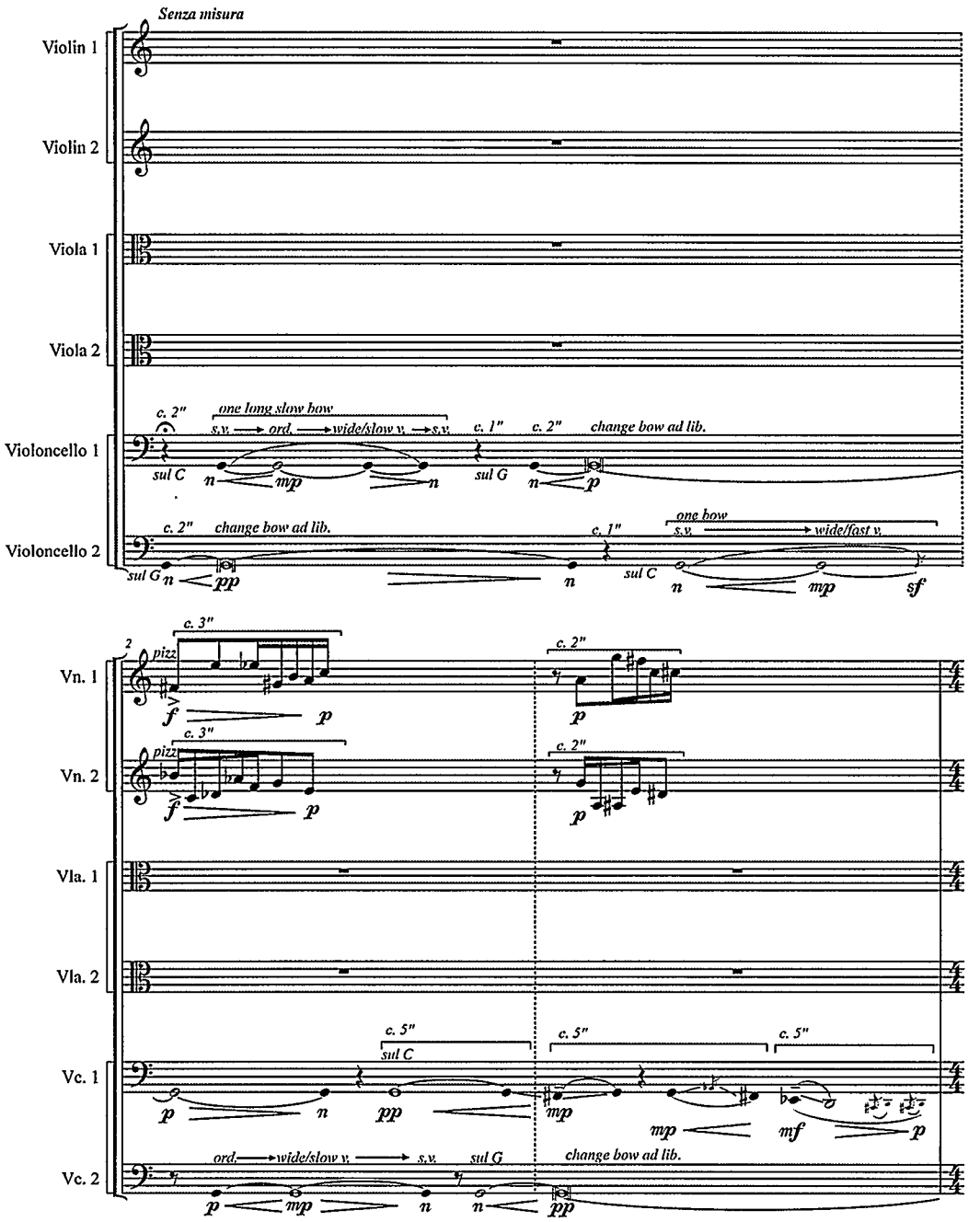
Example 20: Upward-leaping octatonic motive, mm. 54-55



VII. *Sruti* and Ornamentation

Microtonal shading and ornamentation are two distinctive features of North Indian classical music that lend a specific character to a melody or *raga*. In *Smritiraag*, the exploration of microtones begins in the first measure with the use of wide vibrato. Juxtaposing two Gs in the cellos, with one player on the open string (where vibrato is not possible) and the other on the stopped C string moving from no vibrato to normal vibrato to wide vibrato, allows the microtones around the G to become the focus of the opening gesture (Ex. 21). This exploration of microtones in the wide vibrato expands into the glissandi of m. 3, when more microtones can be heard in the slow move to F# and back.

Example 21: Exploration of microtones around G, mm. 1-3



This first use of a glissando establishes it as an important ornament throughout the piece, parallel to the Indian ornaments *meend* (descending glissando) and *soot* (ascending glissando).[18] The glissandi connect adjacent notes in intervals ranging from the minor second to the minor sixth. There is a progression from single-direction glissandi to those

[18] Vaidyanathan, 25.

with a change of direction after briefly touching upon a turning-point note (Ex. 21, m.3).

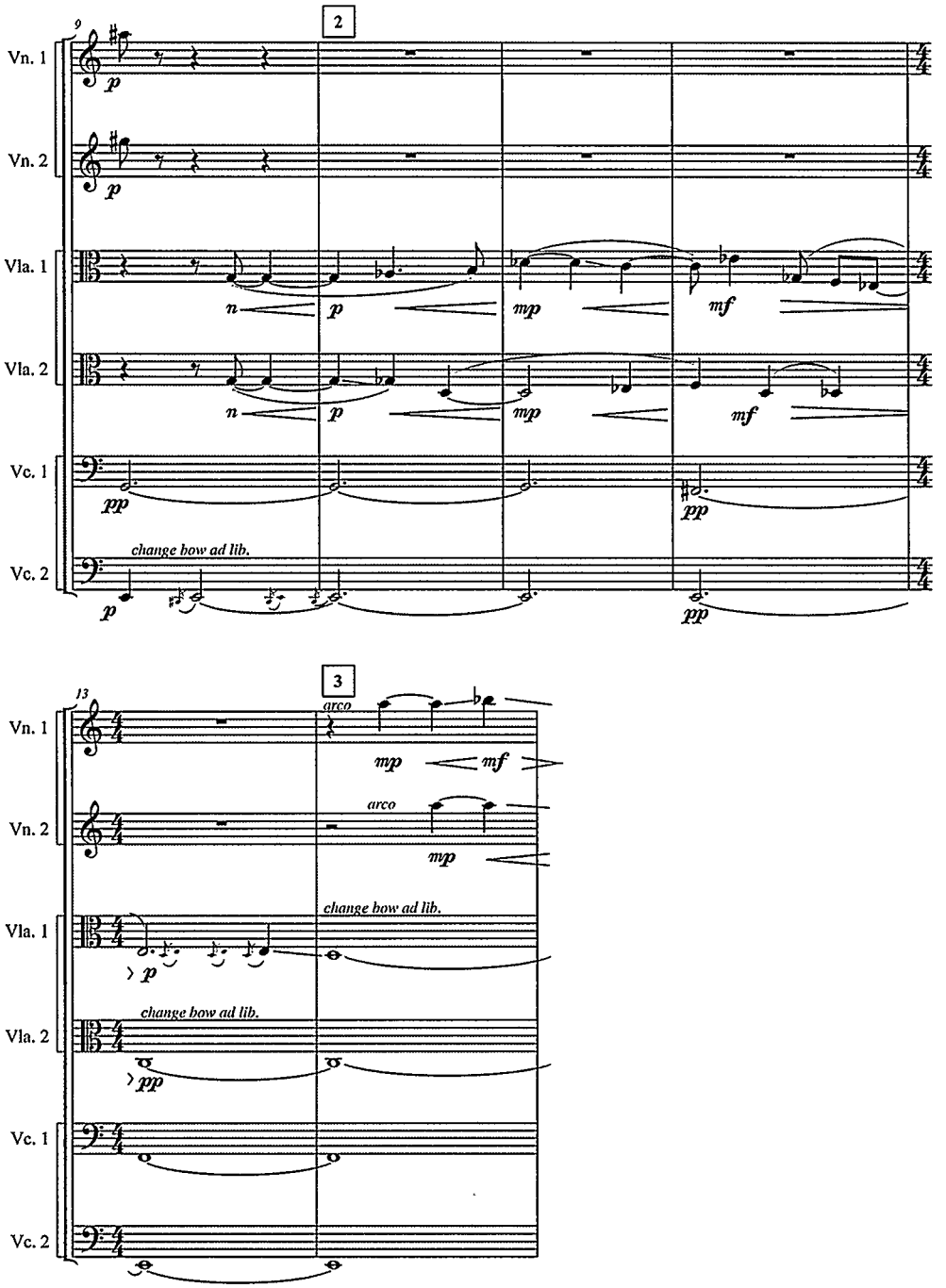
The grace note is the other important ornament in this piece. It is used like a *kana,* leading to a main note, and also like an *andolan*, "swaying" back and forth from a main sustained note to an adjacent grace note (Ex. 21, m.3). This use of the grace note is foreign to the Western tradition and therefore clearly refers to the North Indian classical tradition.

VIII. Drone

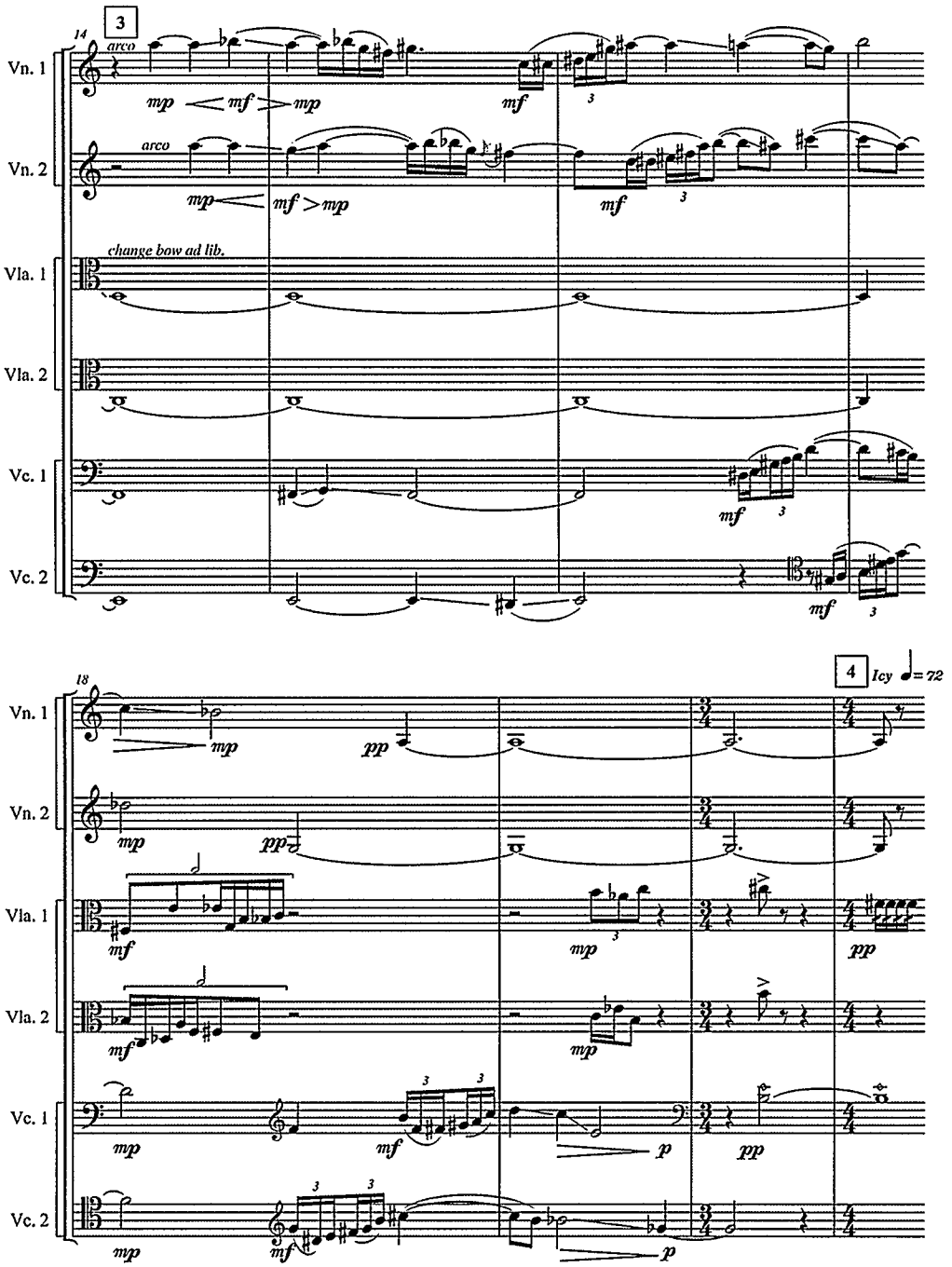
In a *raga* performance, the drone is a constant repetition of the first and fifth notes of the *raga* mode, Sa and Pa, providing the only harmonic element. In *Smritiraag*, the drone appears in many different guises. The opening gesture explores a drone on G in the two cellos, transforming it from a static constant to a dynamic and almost melodic gesture (Ex. 21). This opening gesture is both a reference to a North Indian classical *raga* beginning with the drone and an exploration and development of the drone as a thematic element.

Other instances of a drone appear throughout *Smritiraag*: a simple sustained pitch, a "thickened" drone of two or more pitches, a rhythmically animated drone, and an expanded drone using the notes of a harmonic series. The simple drone, consisting of a single pitch sustained in one part at a time, is the starting point, heard as the sustained G in either cello part from mm. 1 through 9. This expands to a two-note "thick" drone in the two cello parts, a minor third settling to a major second, which supports the "warm" harmonic zone based on the pentatonic elements of *Todi* and the acoustic scale (Ex. 22). This "warm," thick drone is later played by the violas, then the violins (Ex. 23).

Example 22: "Thick" drone in cellos, mm. 9-14



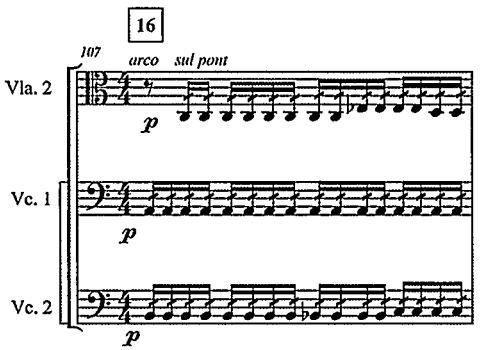
Example 23: "Thick" drone in violas, mm. 14-17 and violins, mm. 18-21



Another exploration of the drone contains a rhythmic element. Using a repeated note instead of a sustained note animates the drone and transforms it from fulfilling only a harmonic role to fulfilling both harmonic and rhythmic roles in the music. The second cello plays an animated drone on the repeated E beginning at R 15 (Ex. 9). This line briefly

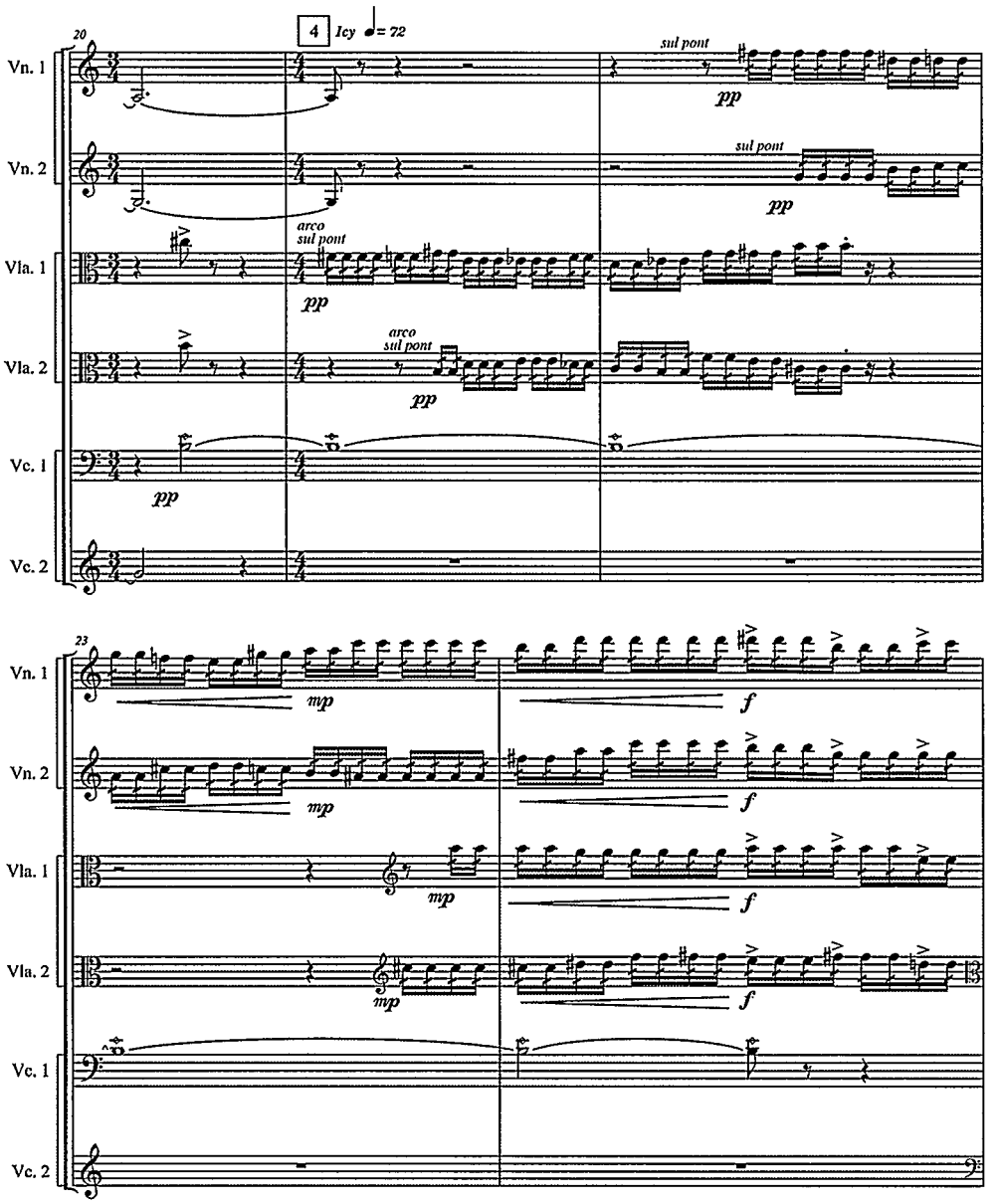
participates in the melodic counterpoint in m. 103 before returning to the drone E. This pattern continues to develop throughout the section, with repeated-note drones becoming moving melody lines and then receding into the background again as repeated notes. As the music progresses, the single repeated-note drone expands to become a repeated-chord drone (Ex. 24), and eventually the notes are shifting so often that the drone disappears.

Example 24: Repeated-chord drone, m. 107, beats one and two

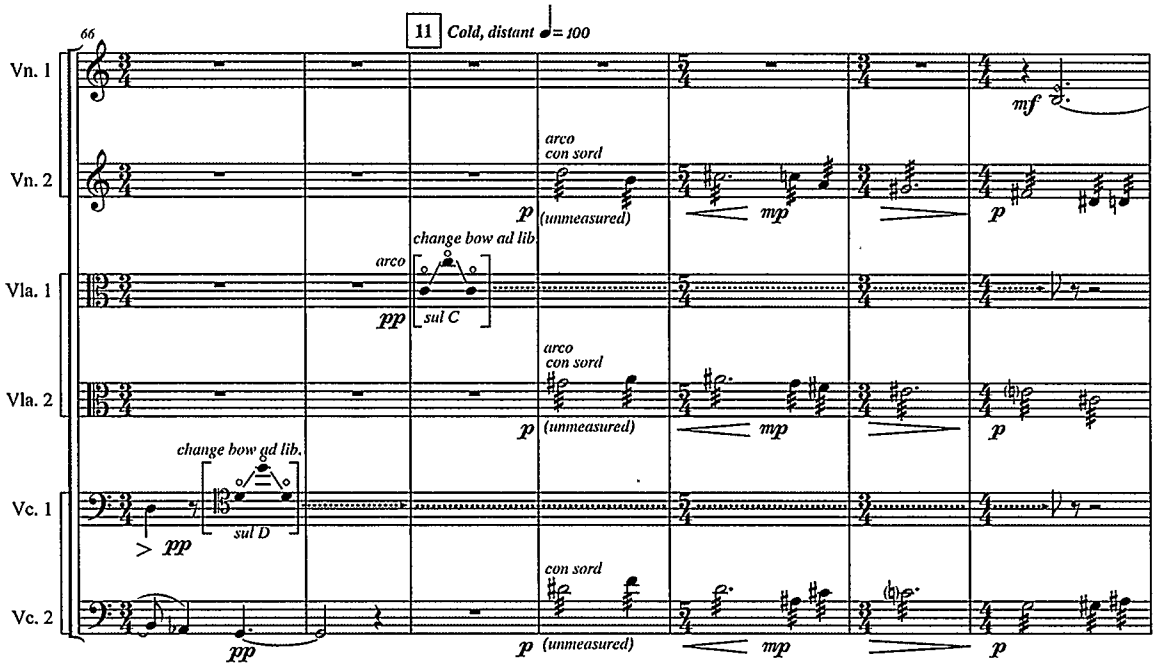


A simple drone in the first cello at R 4 adds the element of timbre (Ex. 25). It is the only instrument playing a harmonic in this section, a distinctive string colour that stands out clearly from the rest of the texture. The "timbre-drone," with the added element of rhythmic animation, recurs more clearly at R 11 through the use of harmonic glissandi in the first cello and viola parts (Ex. 26). Later in this section the first violin also joins in playing a harmonic glissando. This drone is farther removed from the simple drone as these glissandi are made up of several notes from each string's overtone series. The element that unifies all the notes and creates the sense of a constant drone is the timbre of the harmonics. The texture created by three sets of rapidly shifting harmonics is what appears to the ear as a drone.

Example 25: Harmonic drone in cello, mm. 20-24



Example 26: Harmonic glissandi, mm. 66-72



The overtone drone in this section, from R 11, creates a pedal harmony made up of the notes of the D and C overtone series. Because the two overtone series are only a major second apart, the effect of the major-second clashes is of a blanket of sound rather than a clear recognizable harmony. The harmonic progression in muted tremolo that is superimposed upon this backdrop creates sharper dissonance, especially when D-sharp, A-sharp, C-sharp and G-sharp are present (Ex. 26). The dissonance and sense of detachment from the pedal harmony both contribute to the "cold" sensibility of the section.

IX. Harmony

Harmony in *Smritiraag* is drawn primarily from the acoustic, octatonic and *Todi* scales. Harmony is used both to colour the mood of a "warm" or "cold" section and to mark arrival points, usually with a progression from a tense to a relaxed harmony. In the "warm" sections, prominent chords usually originate from the notes of the acoustic scale for tense chords, or the notes of the pentatonic scale (quintal chords) for relaxed harmony (Ex. 27, Fig. 7). In the "cold" sections, the most prominent harmony is derived from the notes of the octatonic mode, often from the octatonic tetrachord, which also generates significant melodic material in *Smritiraag* (Ex. 5, Fig. 8). The tense chords in "cold"

sections include minor seconds, tritones, and major sevenths, while the relaxed chords use fewer of these intervals, more major seconds and wider spacing.

Example 27: "Warm" harmonic progression, acoustic-scale chords to quintal chord mm. 46-48

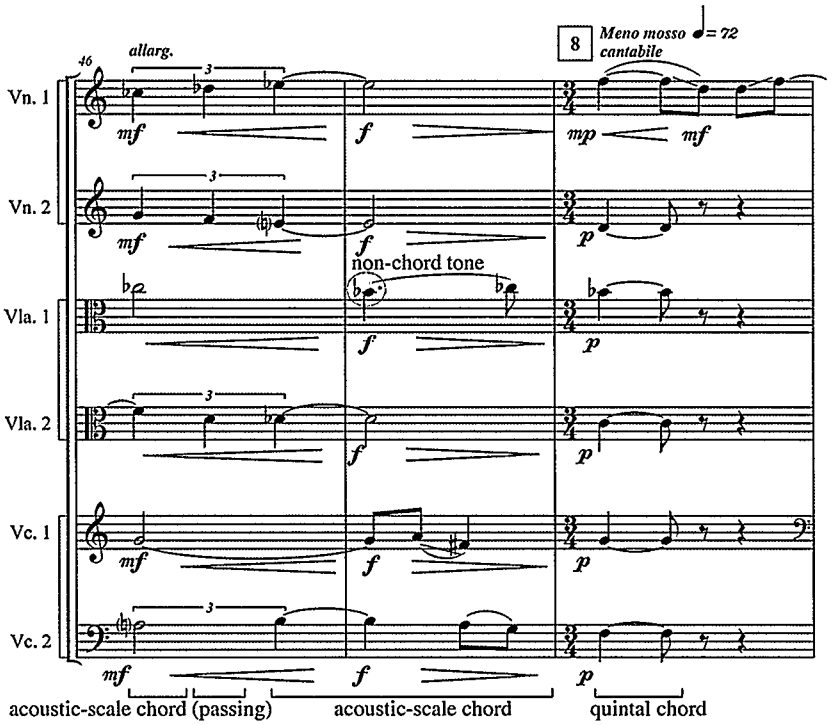


Figure 7: Harmonic reduction of mm. 46-48: chords derived from acoustic scales and pentatonic scale

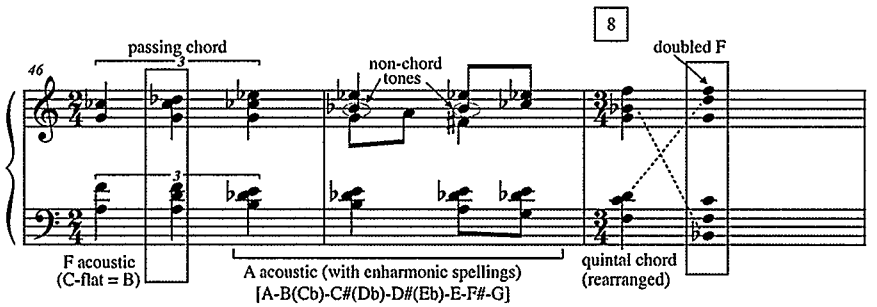
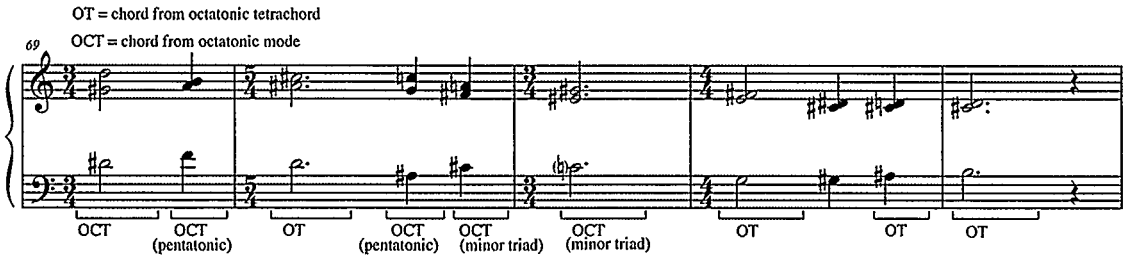


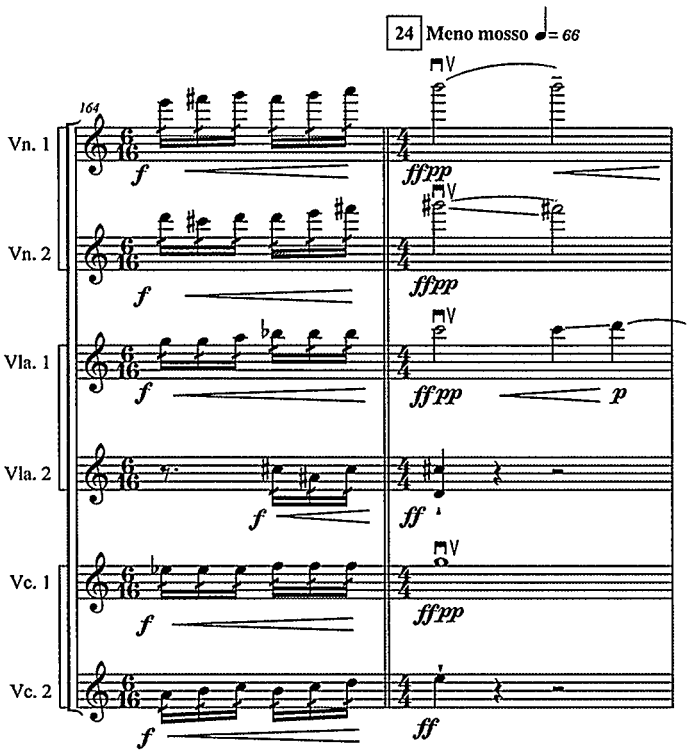
Figure 8: Harmonic reduction of mm. 69-73: "cold" harmonic progression emphasizing octatonic-mode chords



Voice leading in harmonic progressions is mainly smooth and stepwise, often including at least one note in common between successive chords. Bass movement is most frequently by step or small-interval leaps (Ex. 27). In cases where the bass line moves in wider leaps or more angular lines, it is usually providing the main melody, as in the section between R 24 and R 25 (Appendix C).

Cadences at phrase endings and formal arrival points in "warm" sections are usually produced with contrary motion between the outer voices (Ex. 27). One or both of the outer parts is generally stepwise. In "cold" sections more of the cadences use oblique movement of the outer voices (Ex. 5). Although contrary-motion cadences can create a stable and strong arrival, a few important structural cadences use similar motion at points of high tension (Ex. 28).

Example 28: Similar-motion cadence, mm. 164-165



X. Timbre

Timbre plays an important structural role in *Smritiraag*. Colouristic effects help to define the "warm" and "cold" musics and these sections delineate the form. Exploring many different timbres creates a metaphorical link to the intangible and elusive qualities of memory. Often only a scent can create a very strong association with a particular memory, even if the details remain obscured. In the same way, compositionally, hearing a *sul pont* timbre instantly refers back in the piece to any other *sul pont* passage, whether it is concretely remembered or not. The timbres of *sul ponticello* tremolo, pizzicato, and harmonics are so distinctive that they create links between different sections. It is possible to hear these sections as continuously developing even when they are separated in time by other music.

The two main groupings of timbre fall under the overriding metaphor of the musics representing "warm" and "cold" climates in musical terms. The "warm" music uses normal bowed string timbre and tends to linger in low and mid-range registers. Tertial and closely spaced major-second secondal harmony creates the resonance associated with this

colour (Exs. 1 and 16). The "cold" music uses special string timbres, including *sul ponticello,* pizzicato, muted, harmonics and tremolo (Exs. 24 and 25).

The first instance of *sul ponticello* tremolo occurs in mm. 21 through 26 (Ex. 25). This brief section interrupts the flow of music with a contrasting tempo, harmonic profile and timbre. It leaves questions in the mind of the listener as to where it comes from and what its purpose is. The next *sul ponticello* tremolo section, from mm. 60 through 63, leads into a longer section characterized by muted unmeasured tremolo in half of the ensemble (Exs. 6 and 26). Although the *sul ponticello* timbre is missing, the tremolo ties this section, from mm. 68 to 83, to the previous measured-tremolo music. Each time tremolo music is heard, it is in a longer section. With the return of *sul ponticello* measured tremolo in m. 99, a fully-developed section based on the earlier music answers the questions that were raised by its previous entrance (Appendix C, R 15 to 24). This section brings the music to its climax at m.165, completing the development of the *sul ponticello* tremolo timbre.

A similar pattern of development follows the use of pizzicato in *Smritiraag*. The first taste of pizzicato in mm. 2 through 9 is in the form of brief, enigmatic gestures unrelated to the slow unfolding cello lines below. Similar small outbursts of pizzicato appear in mm. 17 to 20. Slightly longer pizzicato gestures develop in mm. 59 through 65, and this time they relate to the surrounding music much more closely (Ex. 6). A repeated pizzicato note in mm. 146 to 149 raises the question of context one last time before the pizzicato returns as an accompaniment texture from m. 183 to 218, finally settled into its main role in the music.

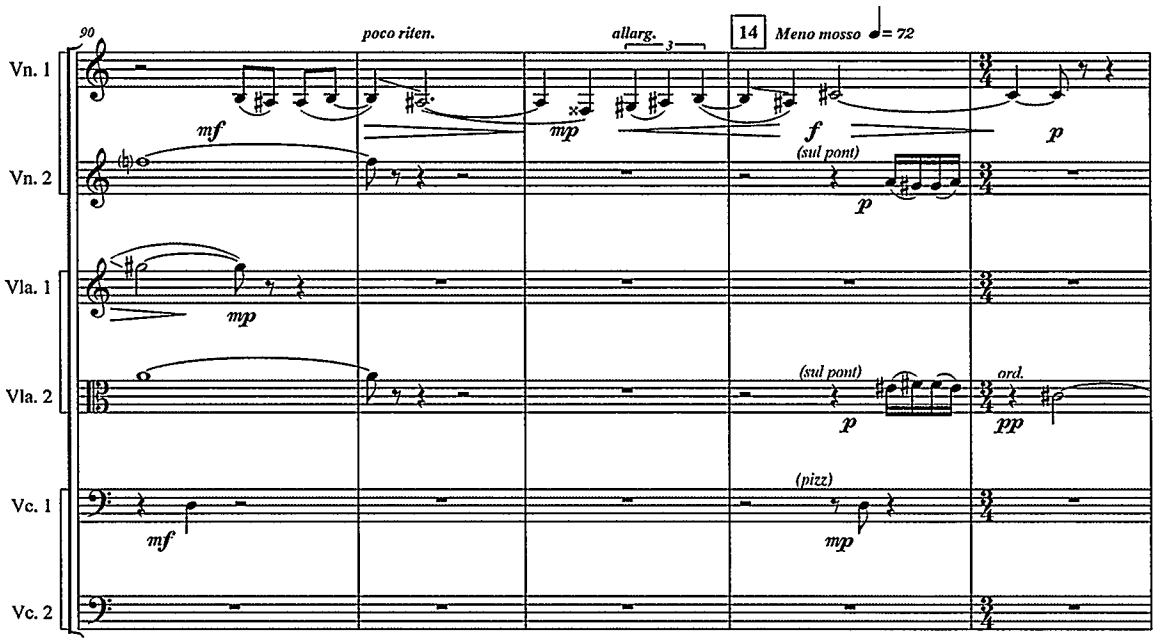
The timbre of harmonics is also first introduced sparsely only to play a more important role in the music later on. The harmonic drone at R 4 develops into both a composite melody and a background texture of harmonic glissandi in the section from R 11 to R 13 (Appendix C).

XI. Development

Melodic development occurs at both the phrase and the sub-phrase level. Melodic phrases are developed through modal change, diminution, and imitation. A melody that returns in a different mode occurs from mm. 27 to 31 (Ex. 1). Originally presented by the

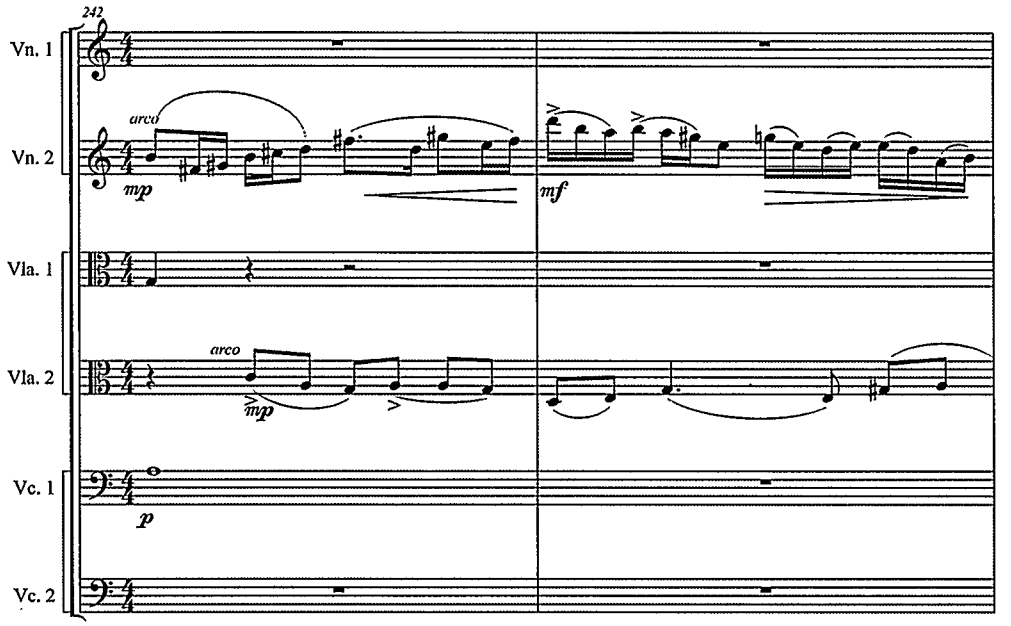
first viola and first violin in the acoustic mode, when it returns in mm. 90 to 94 in the first violin it is presented in octatonic mode (Ex. 29). This modal change also reflects a shift from a "warm" melody in an acoustic-mode harmonic context to a "cold" melody in octatonic mode. Whereas the first is harmonized with sustained lines blossoming from and overlapping with the single melody line, the second is a solo line with sparse accompaniment *sul pont* and pizzicato, timbric characteristics that support the "warm" and "cold" sensibilities.

Example 29: Octatonic mode melody, mm. 90-94



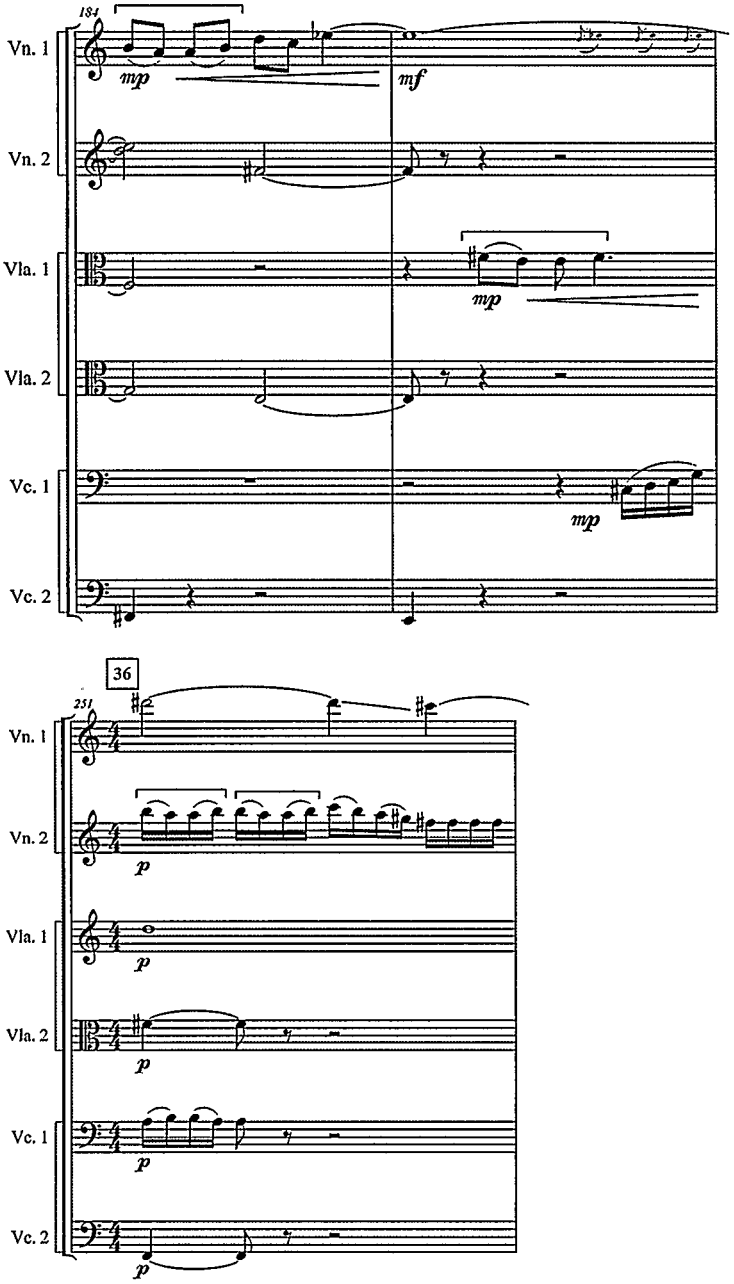
The first viola melody from mm. 218 to 222 is an example of a phrase that undergoes diminution (Ex. 12). It returns in m. 242 in the second violin expressed in shorter note values (Ex. 30). This same melody is presented in imitation with itself at R 31, but the imitation is not exact. The second line, in the first violin, is shifted up to begin on the sixth note of the D *Todi* mode, instead of the original fourth note (Ex. 12). Therefore, the melodic contour and rhythm are the same but the intervals are different.

Example 30: Diminution of melody, second violin, mm. 242-243

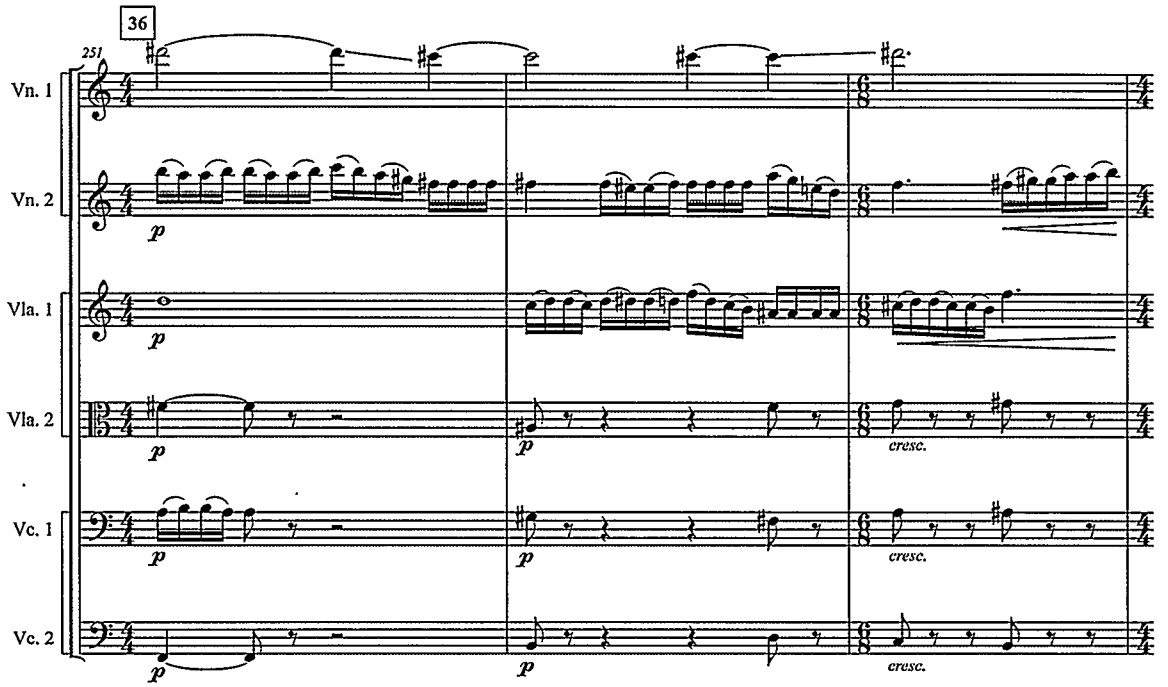


Short melodic motives within phrases undergo various developmental changes including diminution, augmentation, inversion, and expansion or contraction of intervals. The motive that is heard in the first viola in m. 27 becomes the basis for much of the motivic development throughout the piece (Ex. 1). It appears later in the piece in diminution (Ex. 31) and augmentation (Ex. 32). Frequently appearing in related versions contracted to the interval of a minor second (Ex. 33) or expanded to the interval of a minor third (Ex. 2) instead of its original major second, this motive also appears in inverted form (Exs. 33 and 34). Sometimes this melodic motive is harmonized symmetrically with its inversion, in any of the interval forms in which it appears (Ex. 34).

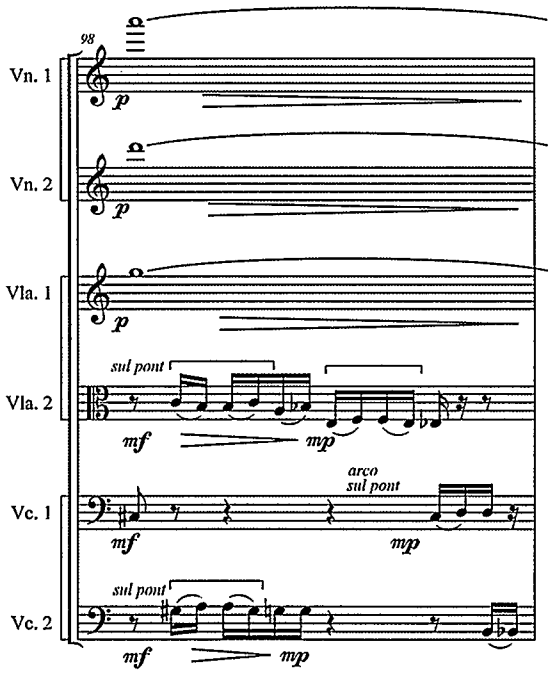
Example 31: Melodic motive in diminution, mm. 184-185 and 251, vn. 2



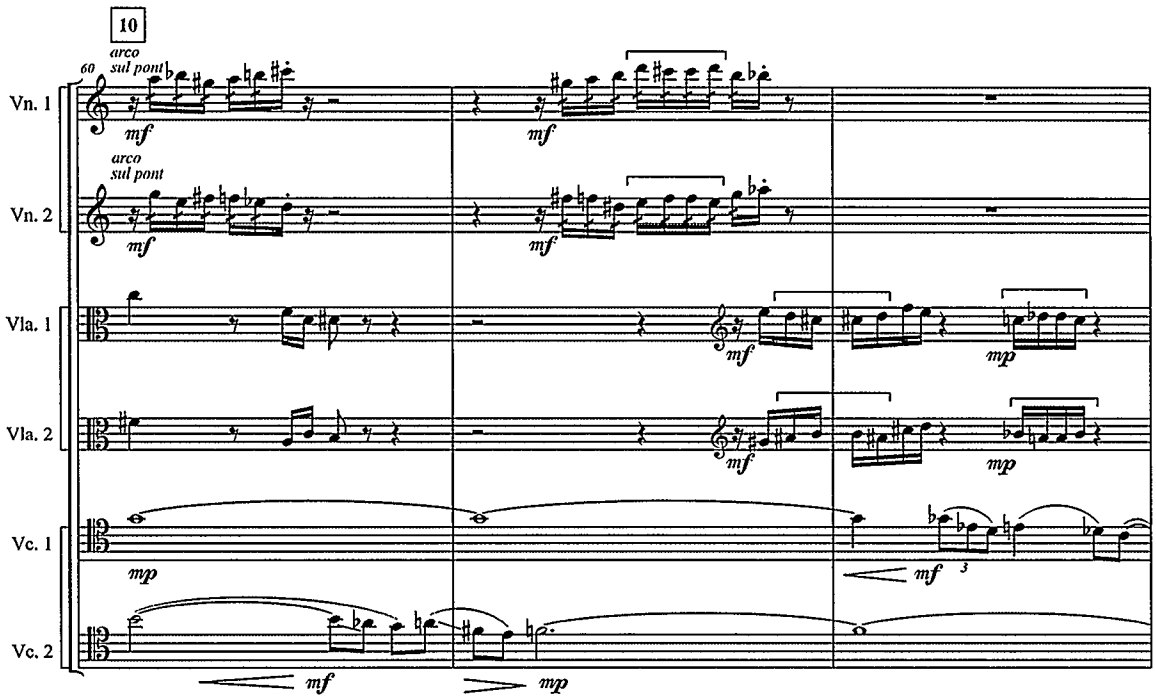
Example 32: Melodic motive in augmentation, mm. 251-253, vn. 1



Example 33: Melodic motive contracted, m. 98

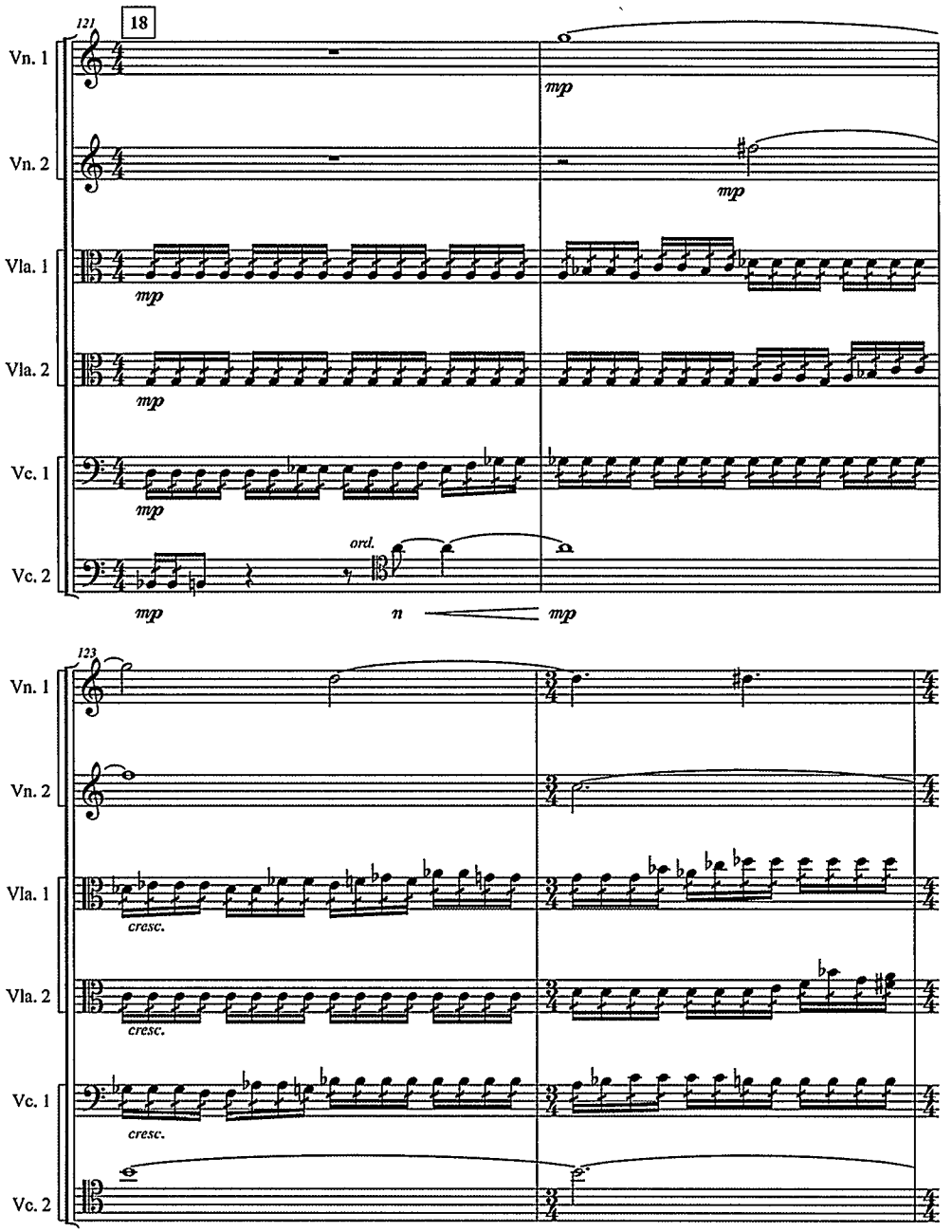


Example 34: Melodic motive harmonized with its inversion, mm. 60-62



The octatonic-mode pizzicato fragment performed by first violin in m. 2 (Ex. 21) undergoes development by augmentation and a change of timbre. When this motive returns in mm. 121 to 124, it is played arco by the violins and second cello as a composite melody and in longer rhythmic values (Ex. 35).

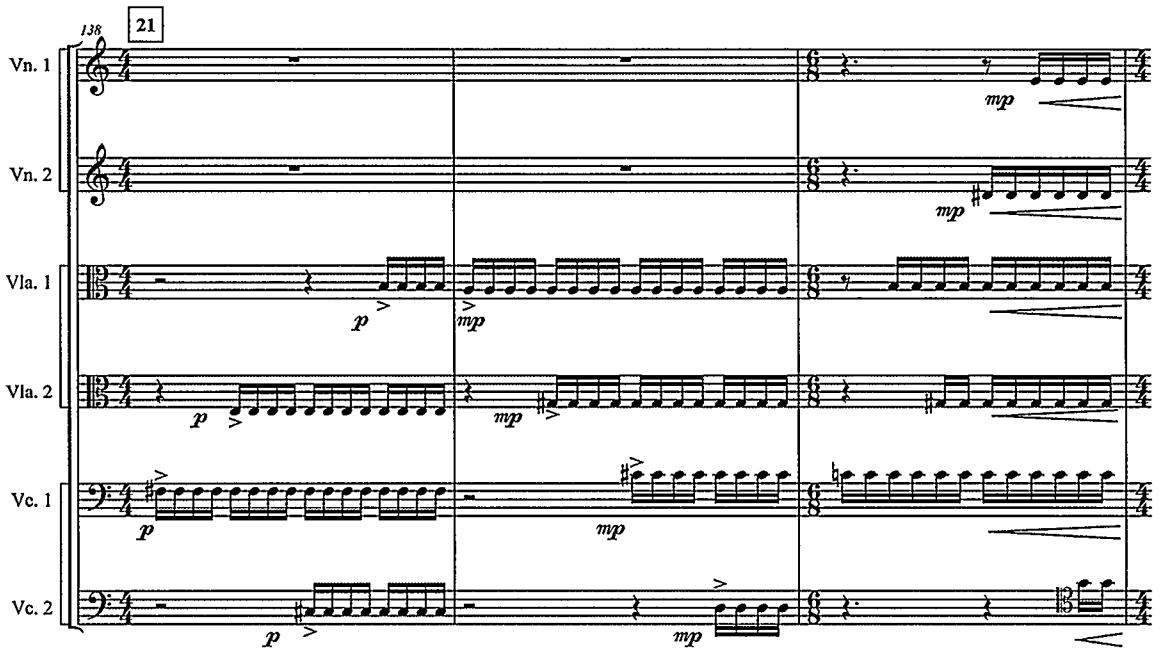
Example 35: Composite melody, octatonic mode, mm. 121-124



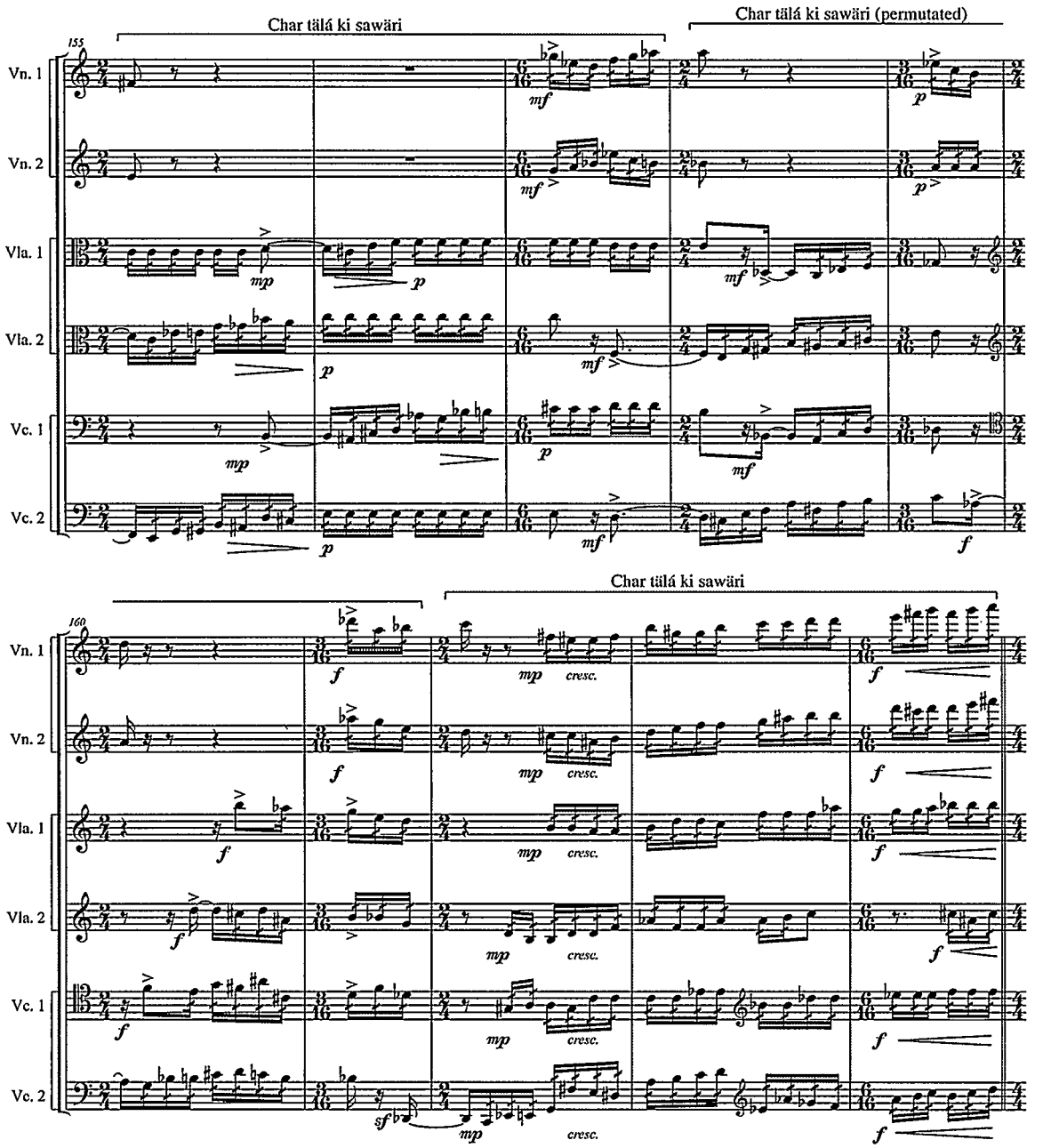
Some elements of rhythmic development have already been discussed. The rhythmic phrasing of a melody is developed by diminution, augmentation and layering of different rhythms. The *talas* that organize a framework of time signatures can similarly be developed by diminution. An example is the *tihai,* or rhythmic cadence, that leads to R 24. This *tihai* is based on the repetition of a pattern of time signatures instead of being based on

a particular rhythmic phrase. The pattern of time signatures used for this *tihai* is derived from the *tala Char tälá ki sawäri* (Fig. 6), which is seen at R 21 (Ex. 36). When the pattern of time signatures returns at m. 155, it is in diminution (Ex. 37). To create a *tihai,* the traditional method is to repeat a rhythmic pattern three times. In this case, however, the second repetition undergoes a permutation by cutting the compound duple-metre measure in half and rearranging the order (Ex. 37).

Example 36: Time signatures arranged according to *Char tälá ki sawäri,* mm. 138-140



Example 37: Time signatures arranged according to *Char tälá ki sawäri* in diminution; *tihai*, mm. 155-164



XII. Conclusion

The research I did into North Indian classical music provided many ideas that stimulated my composing. I have only begun to explore a fraction of the possibilities

suggested by combining concepts from North Indian music with those from the Western musical tradition. Learning about the *raga* and *tala* systems of Hindustani music has enriched my creative process and I am interested in pursuing this further. Before this project, I composed music that was primarily organized by the use of small intervallic cells and tended toward dissonant harmony focusing on intervals of sevenths, fourths, and tritones. I feel that incorporating modal elements and rhythmic cycles into my music has broadened my expressive palette. In the composition of *Smritiraag,* I worked with modal melodies that move from one scale or transposition to another through the use of common tones, and I explored varying levels of tension in tertial and non-tertial harmonies. Incorporating scales and modes into my musical language has opened up a wider range of expressive possibilities from simple stepwise melodic movement and consonant harmony to angular lines and dissonant harmony. The rhythmic cycles in *Smritiraag* provided a framework for the formal organization of the music, a technique I will explore in future compositions.

Writing for string sextet challenged me to stretch my boundaries and learn about string writing in greater depth. The addition of a viola and cello to the traditional string quartet provides greater opportunity for dialogue between instruments in the lower registers. The richness and variety within the sextet ensemble impelled me to discover many timbres and colour combinations that I can take to future projects.

I will continue to pursue research into music from other cultural traditions in greater depth as a means to further expand my technique and versatility as a composer.

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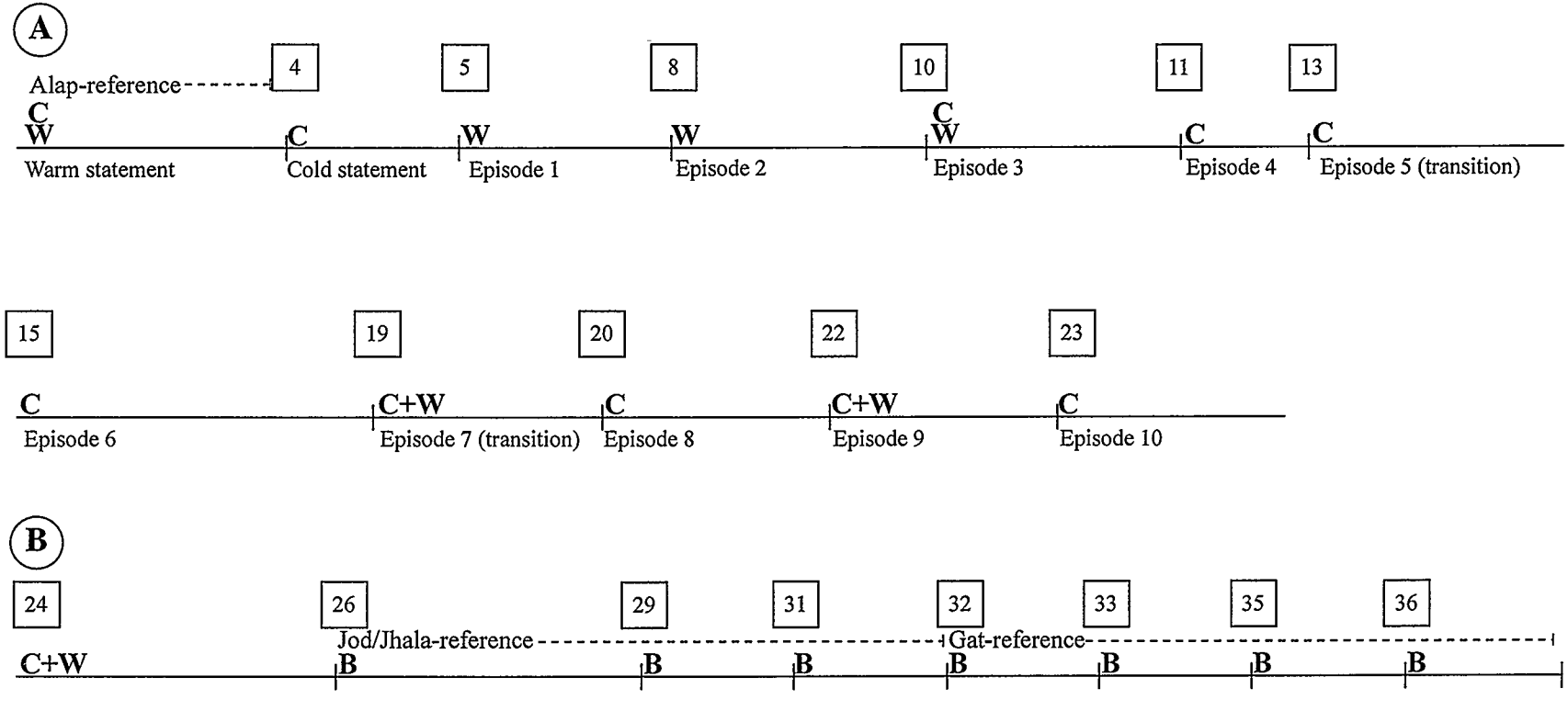
APPENDIX A: *Smritiraag* form diagram

C = cold
W = warm
C
W = cold juxtaposed with warm
C+W = cold and warm beginning to blend
B = a blended mix of cold and warm



APPENDIX B: Performance notes

Glissandi are to be played starting at the beginning of a note and lasting for its full duration, where possible. This often results in very slow glissandi.

Example: measure 5, Vc 1: The *gliss* begins on beat two and lasts until arriving at the G on beat three.

Grace notes written within a sustained note are to be very lightly touched upon before returning to the sustained note, which is indicated with a small note head. The grace notes are proportionally notated and should be played in an improvisatory, rhythmically fluid manner.

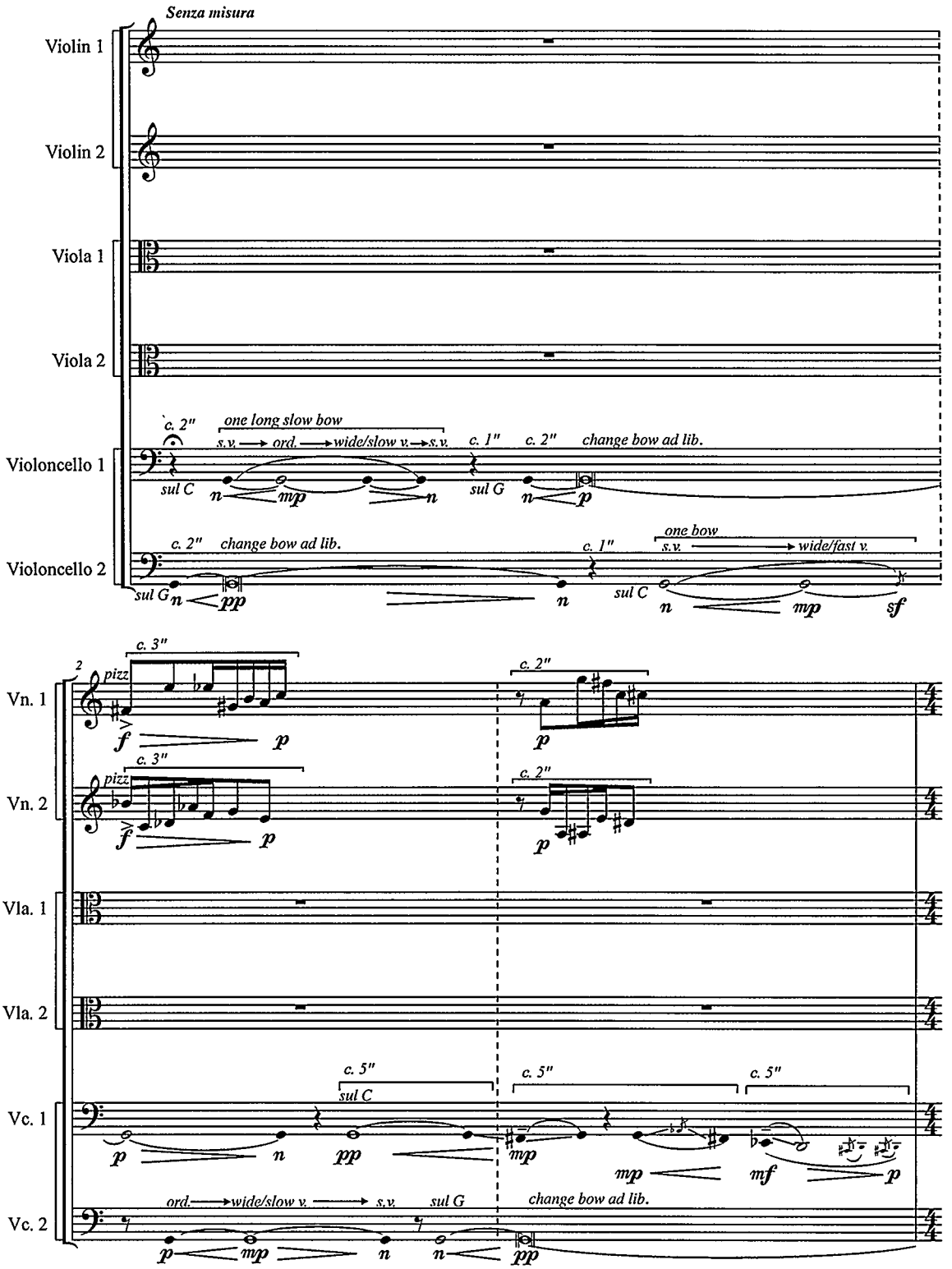
Example: measure 4, Vc 1: The first two grace notes are proportionally notated within the B-flat they return to. The third grace note, however, is played just before beat four because it is notated in connection to a regular note (not a small note head).

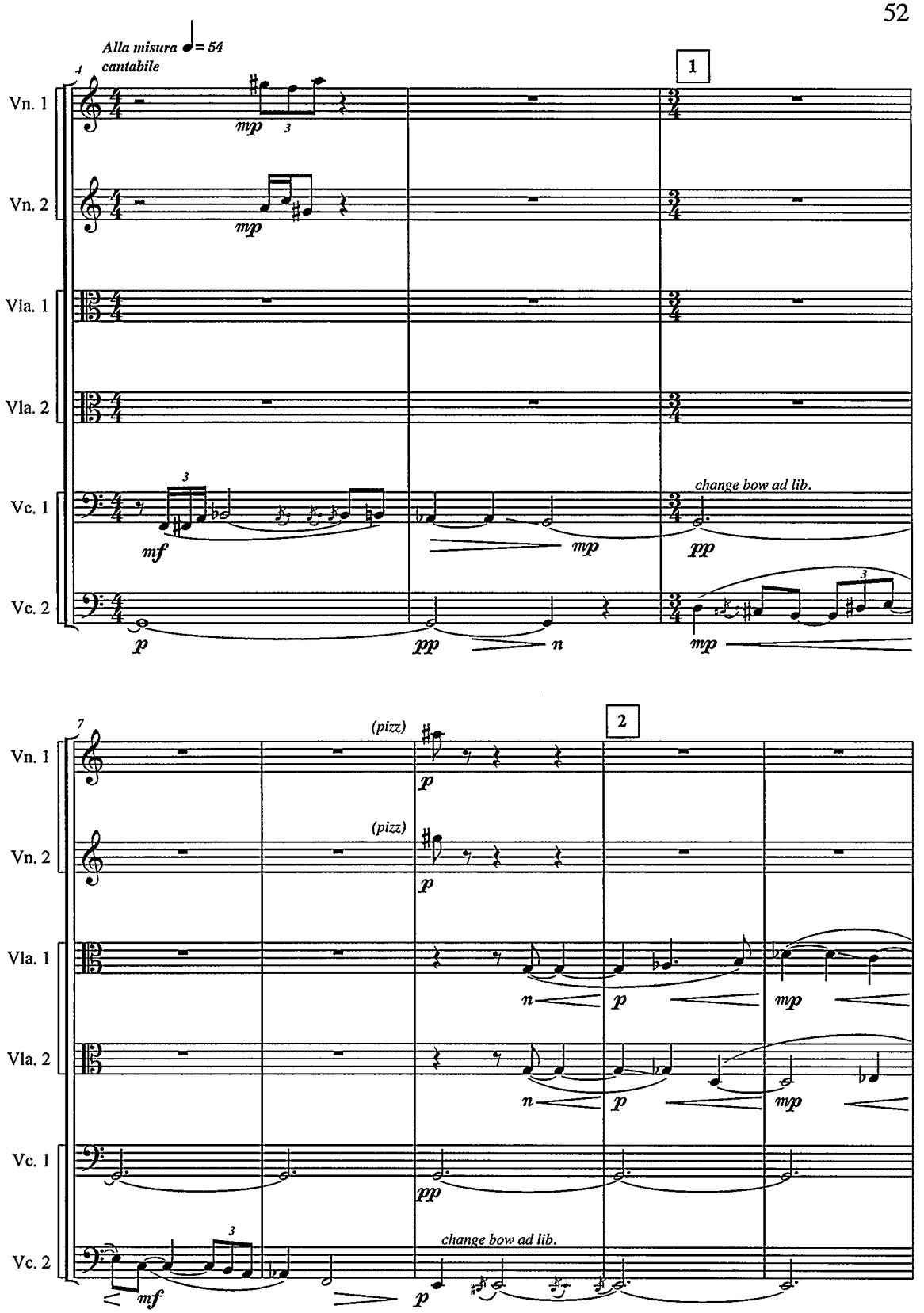
Harmonic *glissandi* move up and down an open string, touching on harmonic nodes and so briefly sounding the natural harmonics. They are notated to indicate the upper and lower harmonics at either extreme of the *gliss*. The speed of these glissandi should be fairly quick and steady in tempo. Bowing is *ad lib* and should not synchronize between parts when two or more are playing harmonic glissandi.

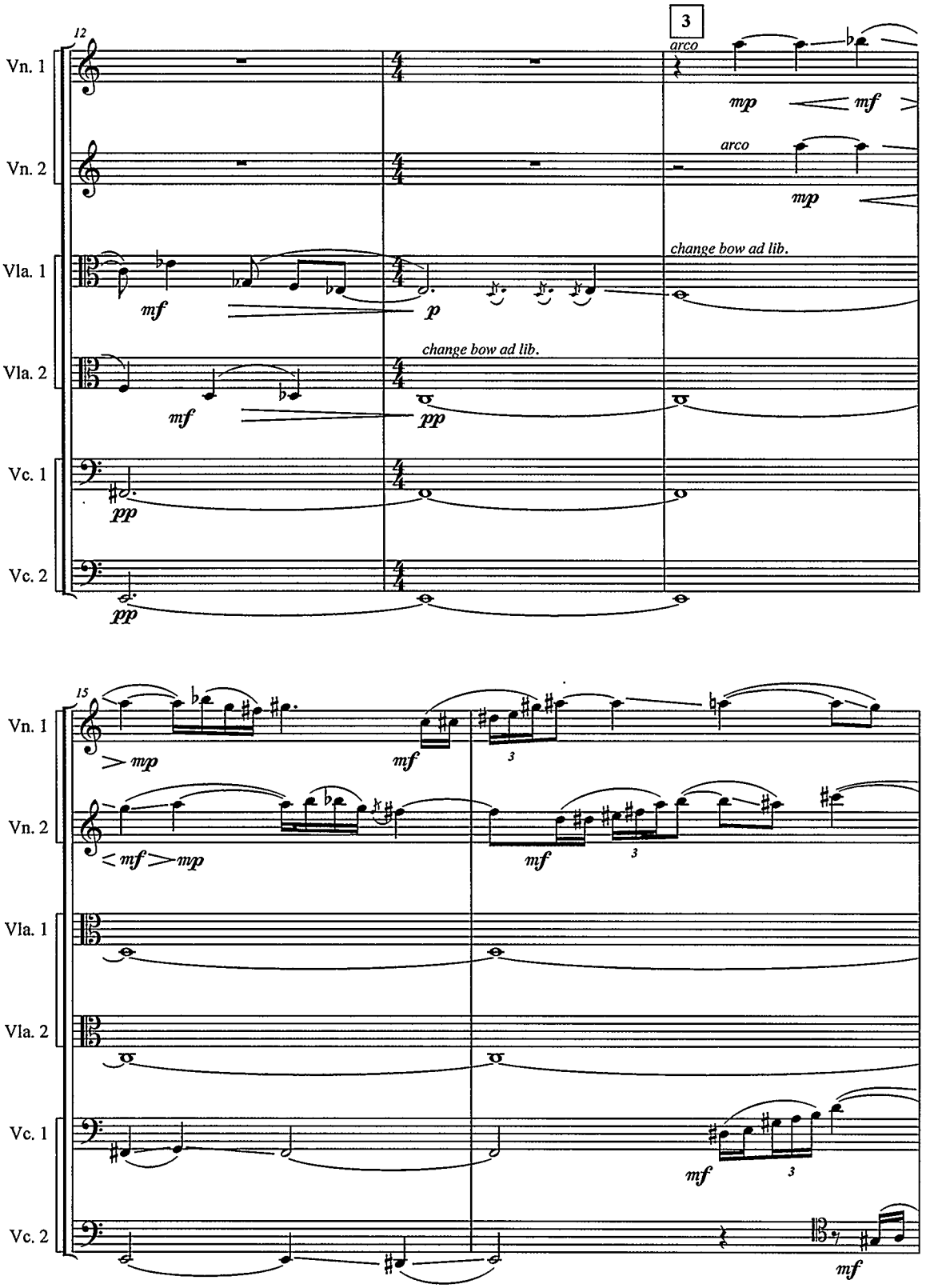
Example: measure 66 to 72, Vc 1: Begin the *gliss* on the first notated harmonic halfway through beat two and turn around at the second notated harmonic; continue up and down in this manner until beat two of measure 72, stopping on whichever harmonic occurs on beat two.

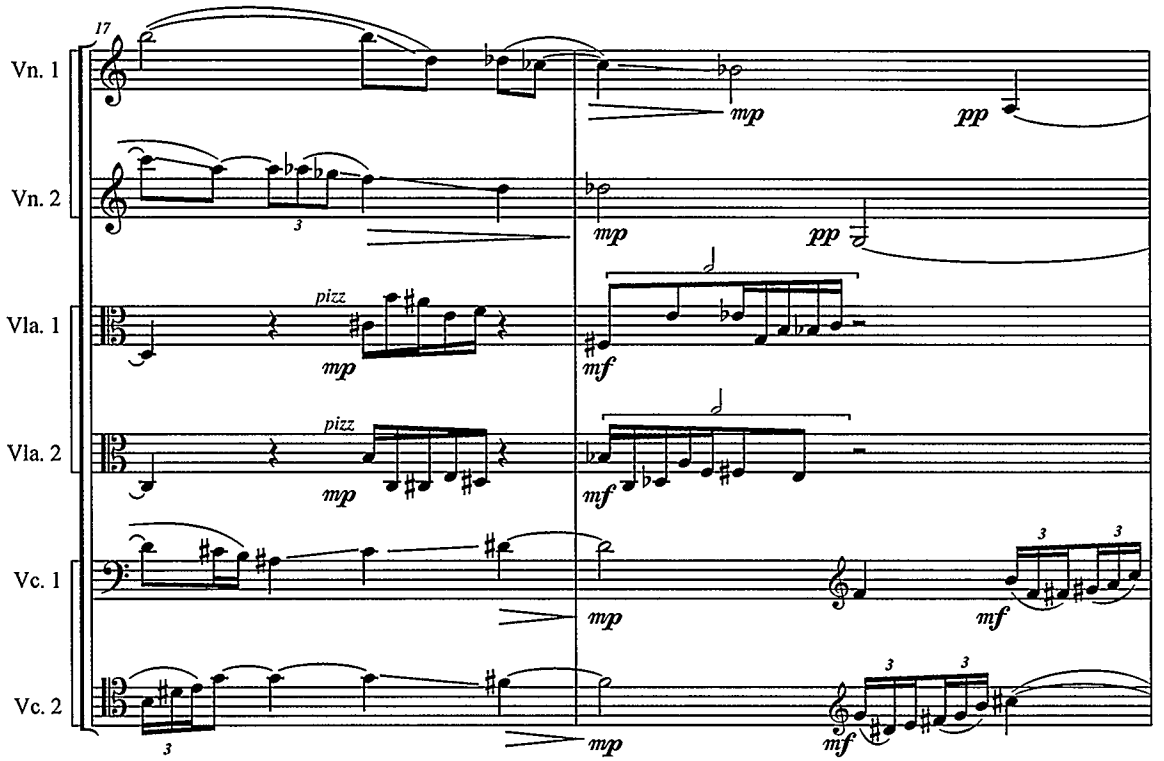
Smritiraag

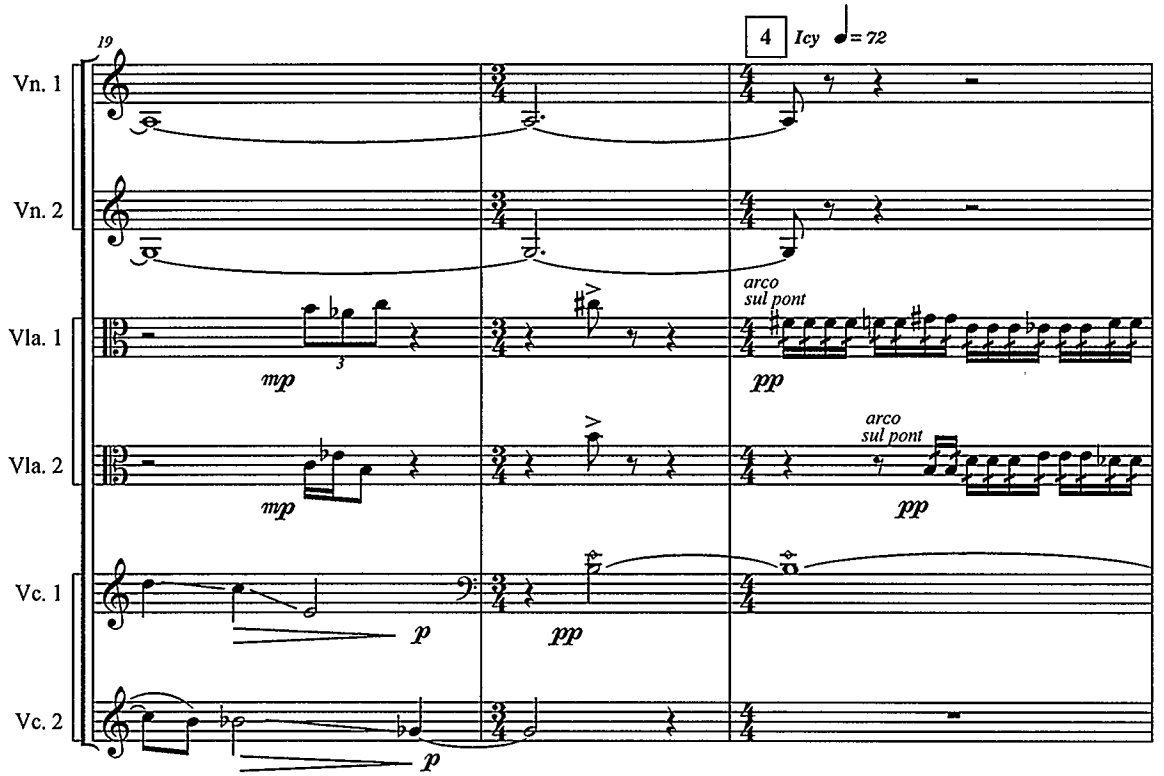
Sonya Guha-Thakurta

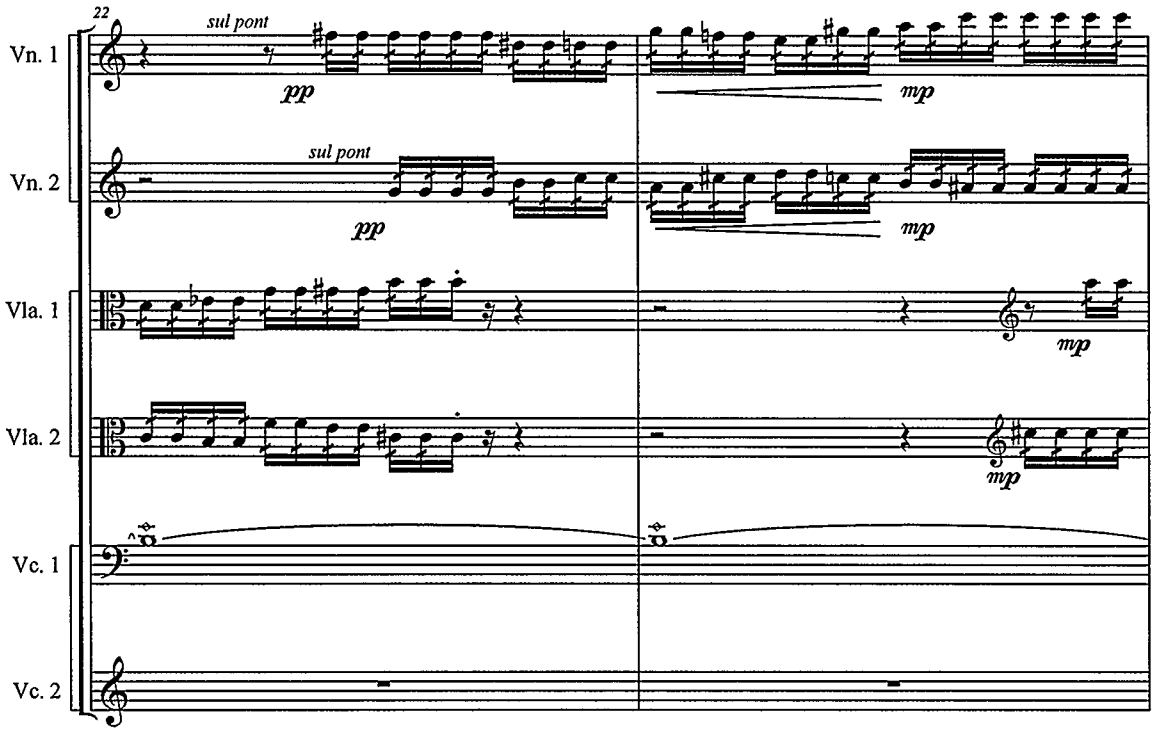


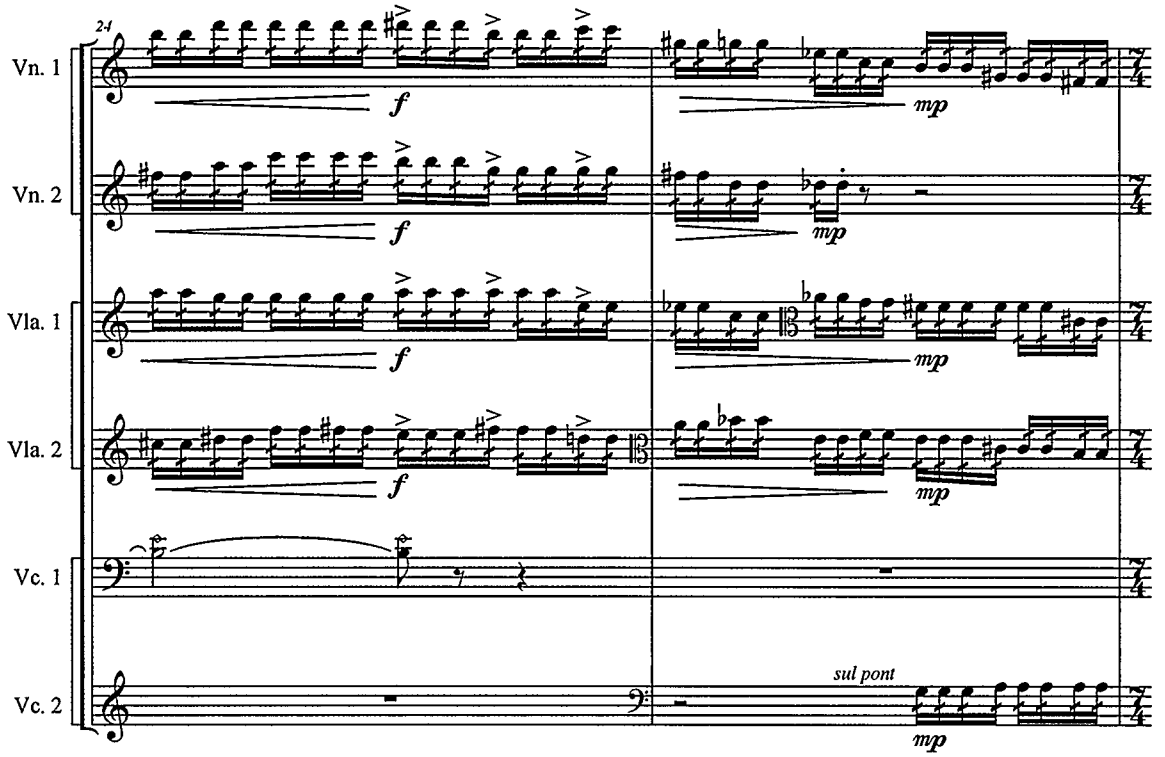

Alla misura ♩= 54
cantabile
1
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
change bow ad lib.
2
(pizz)
change bow ad lib.

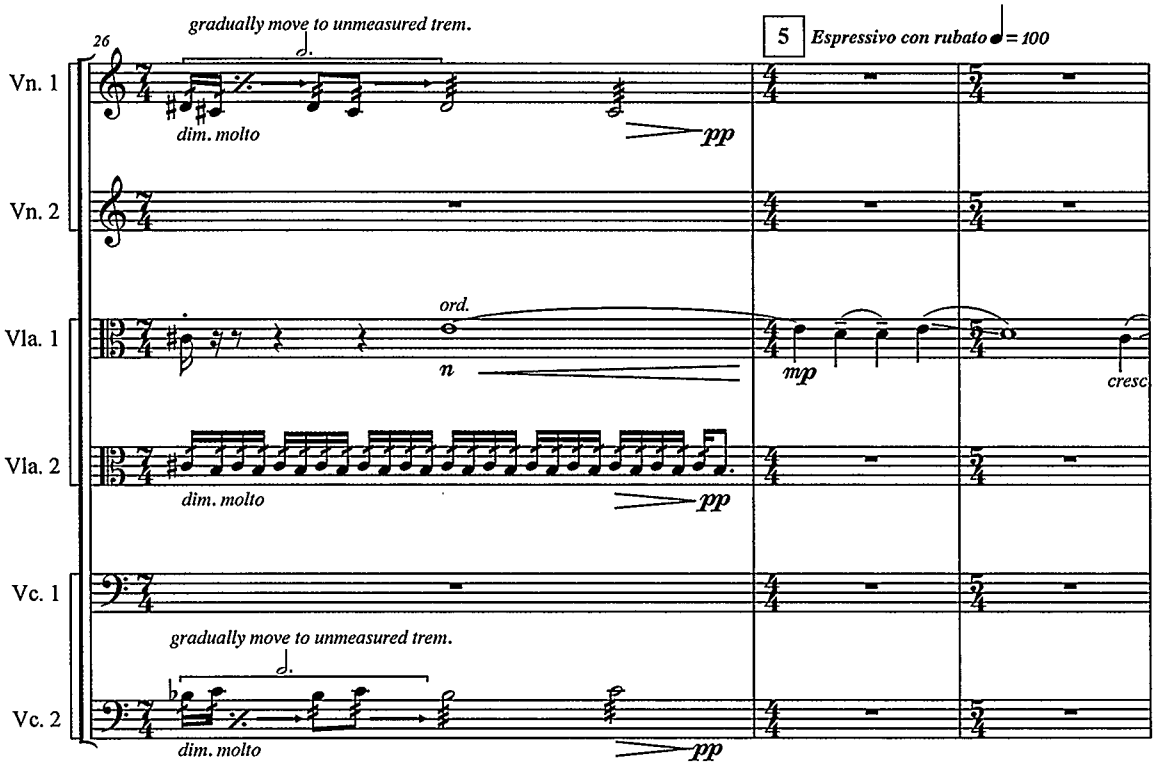

12
3
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
arco
mp
mf
arco
mp
change bow ad lib.
mf
p
change bow ad lib.
mf
pp
pp
pp
15
mp
mf
3
mf
3
mf
3
mf

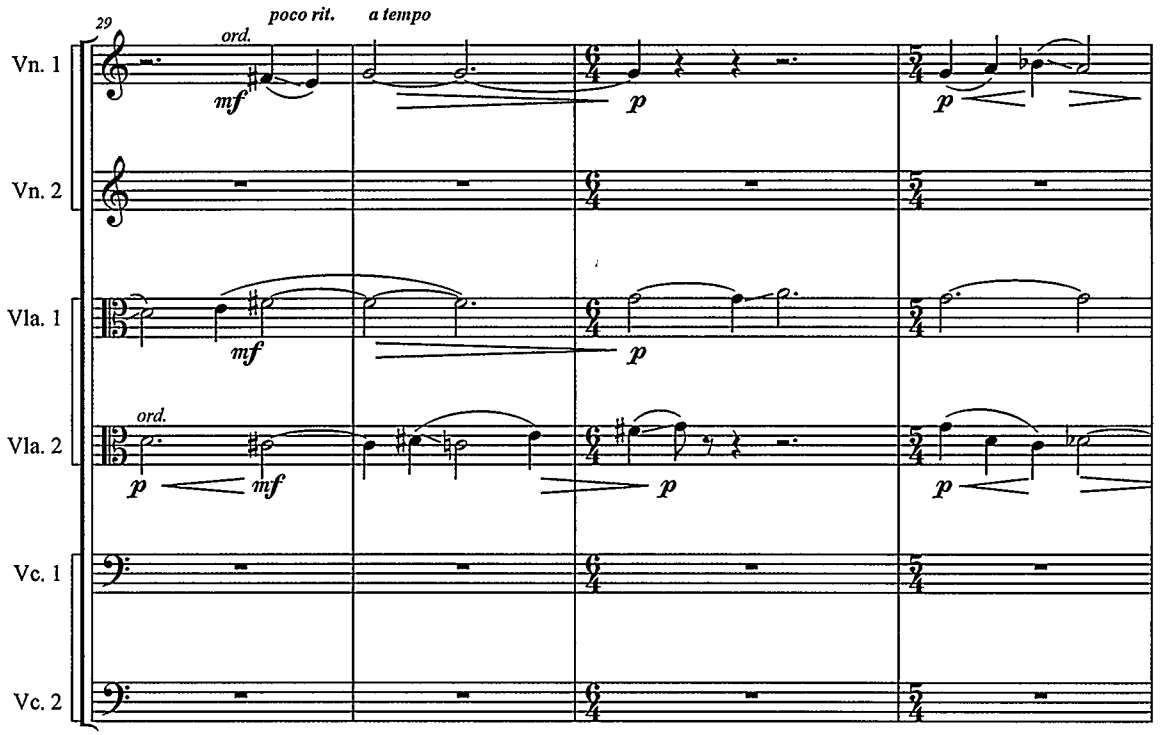

17
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
pizz
mp
mf
pp
3

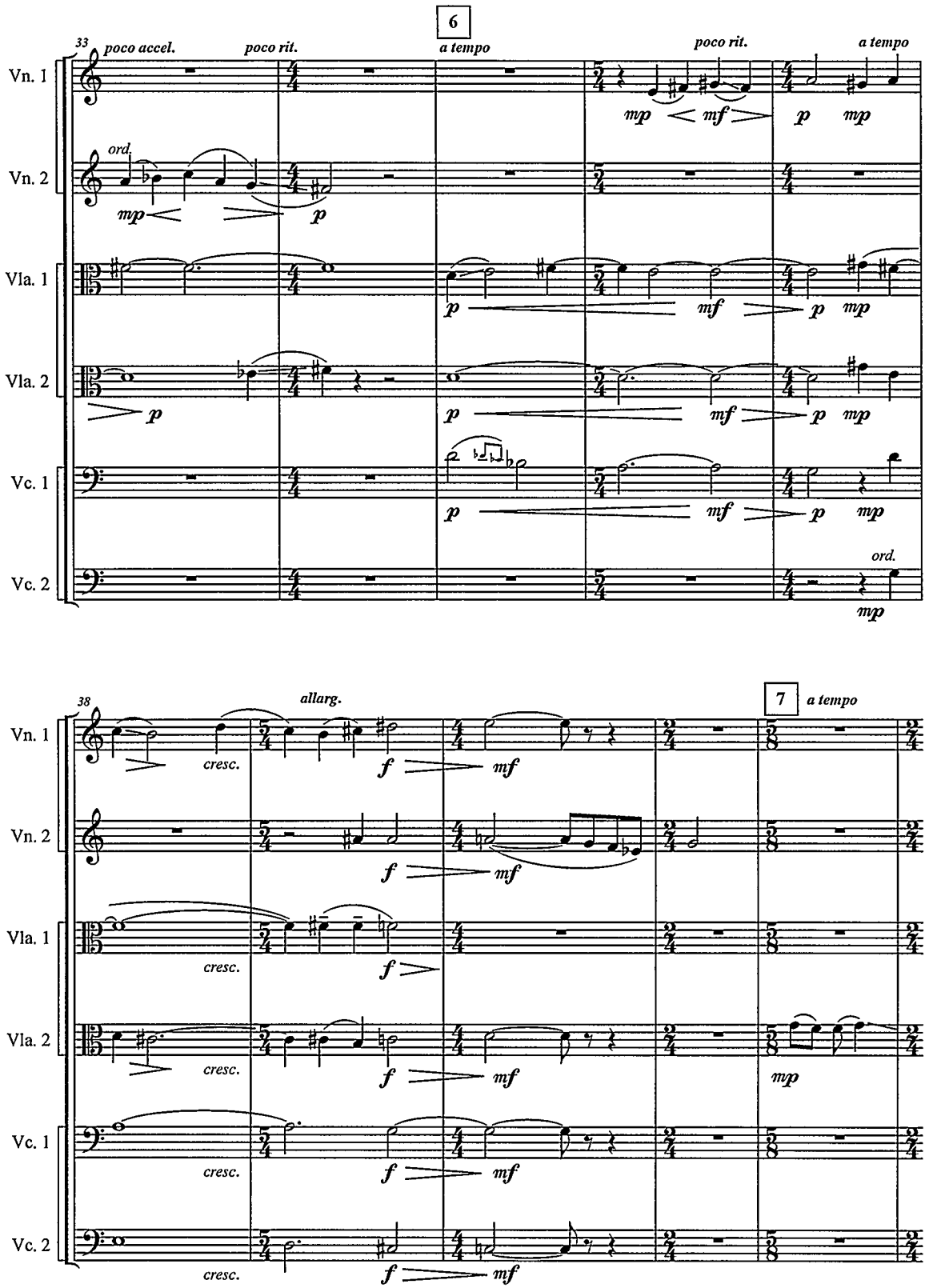

19
4
Icy
♩= 72
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
arco
sul pont
mp
pp
p
3

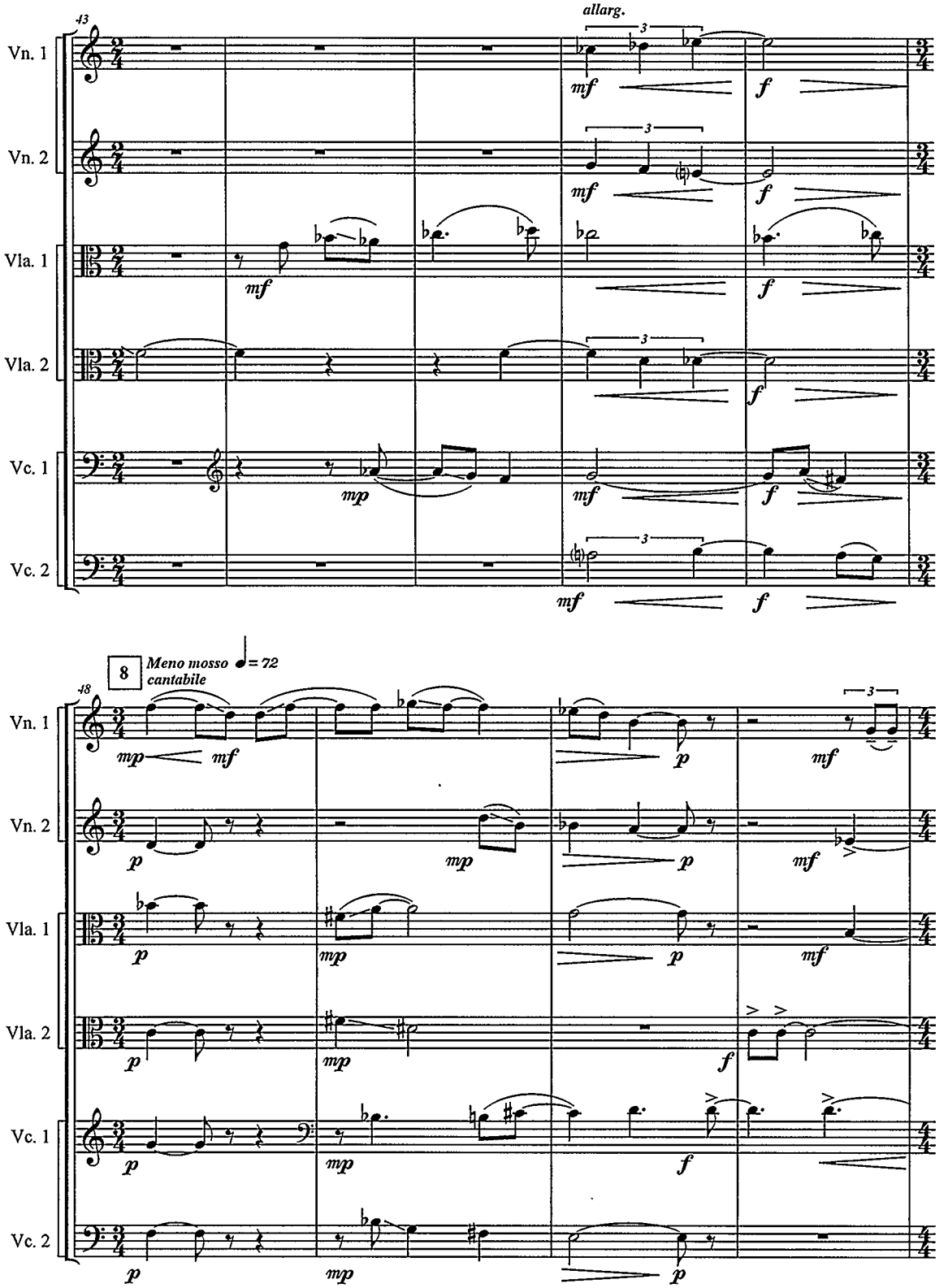

22
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
sul pont
pp
mp

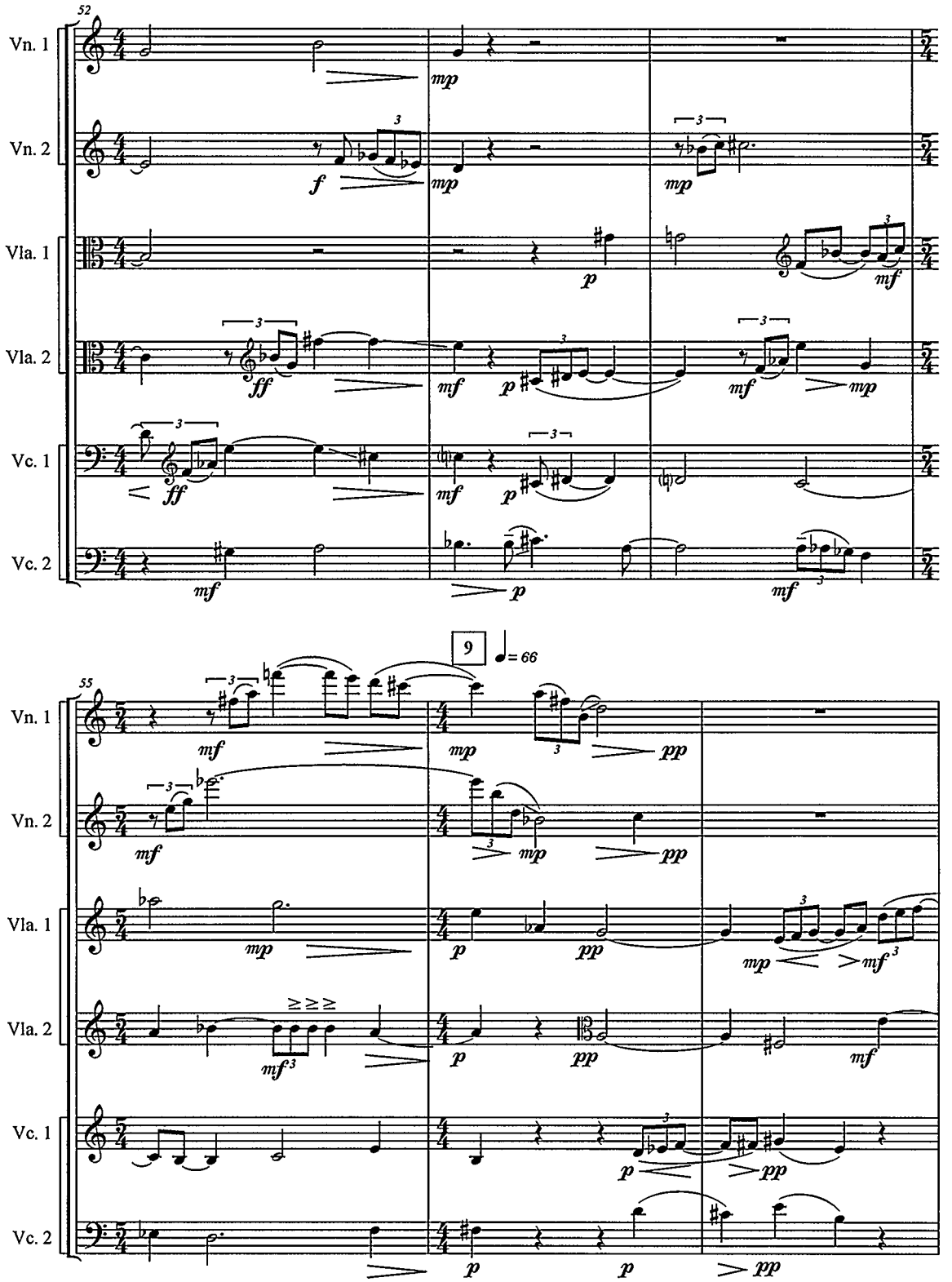

24
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
f
mp
sul pont

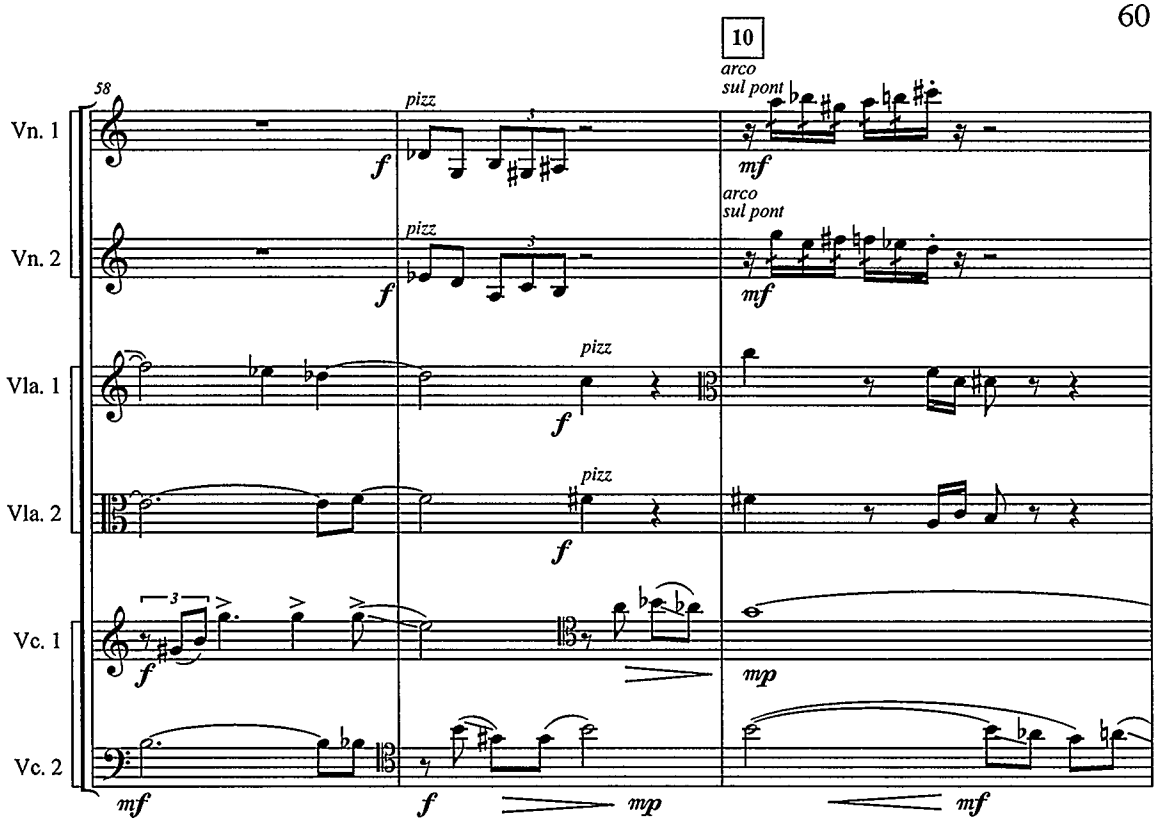

26
gradually move to unmeasured trem.
5
Espressivo con rubato ♩= 100
Vn. 1
dim. molto
pp
Vn. 2
Vla. 1
ord.
n
mp
cresc.
Vla. 2
dim. molto
pp
Vc. 1
gradually move to unmeasured trem.
Vc. 2
dim. molto
pp

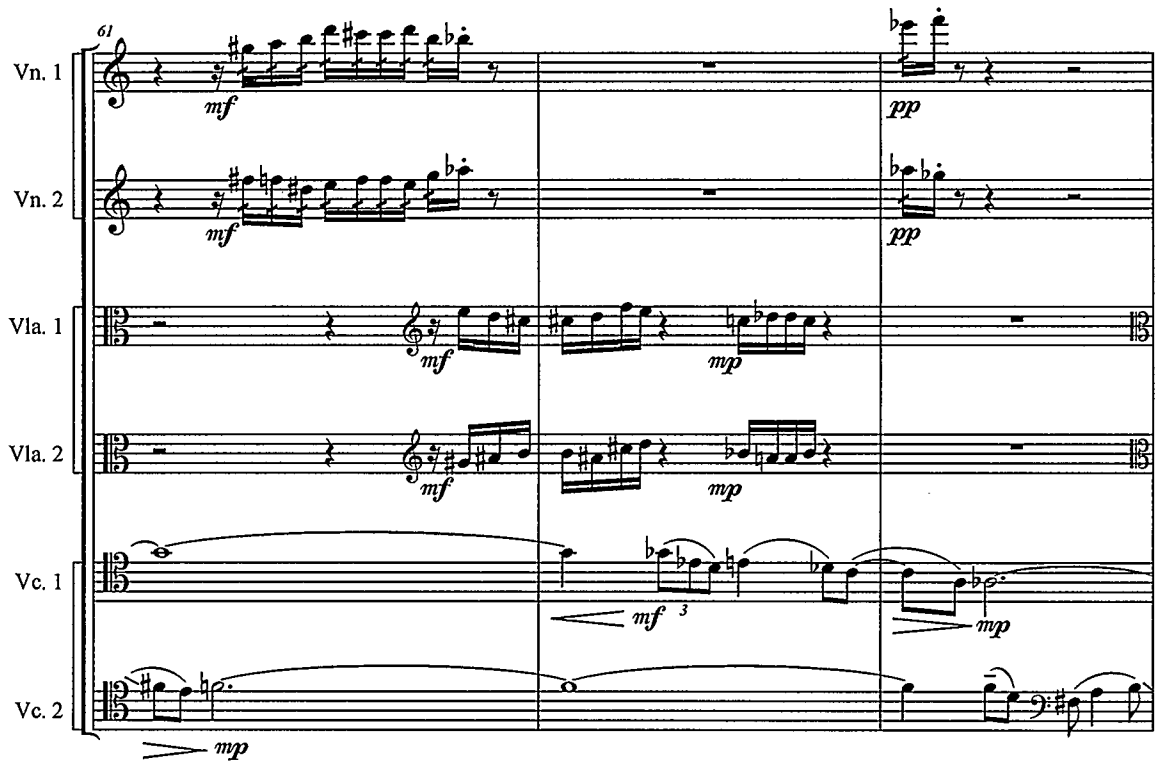

29
poco rit.
a tempo
Vn. 1
ord.
mf
p
p
Vn. 2
Vla. 1
mf
p
Vla. 2
ord.
p
mf
p
p
Vc. 1
Vc. 2

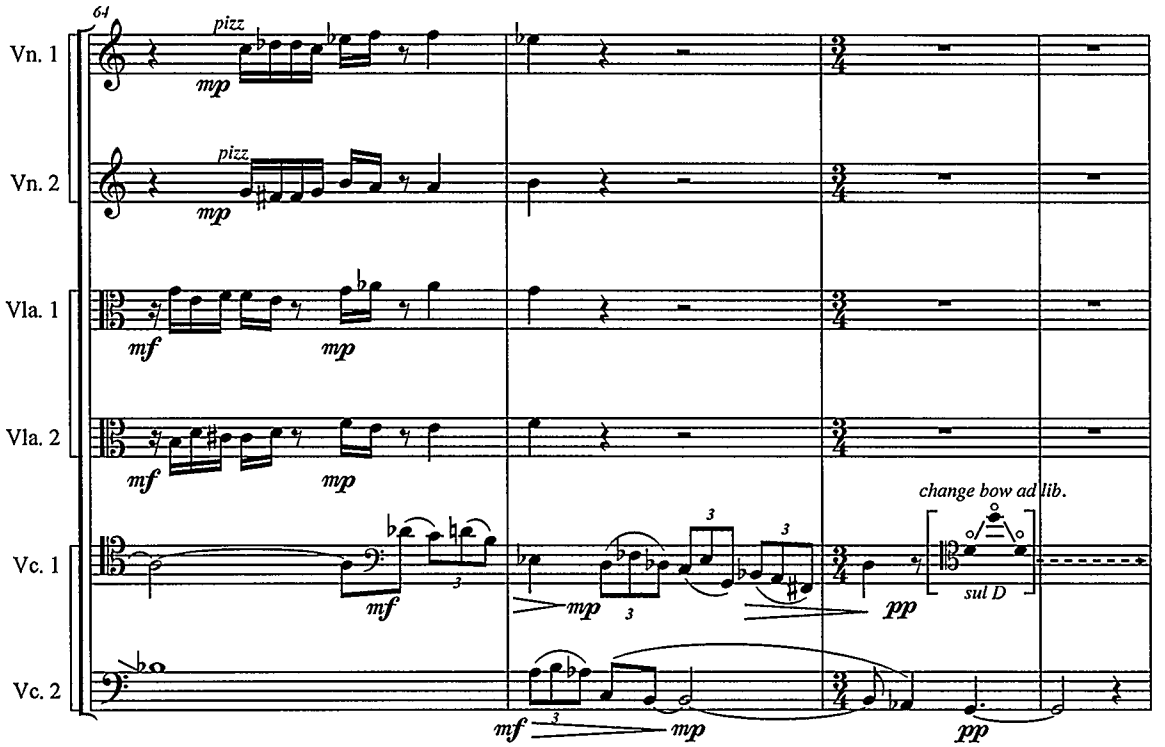

6
33
poco accel.
poco rit.
a tempo
poco rit.
a tempo
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
ord.
mp
mf
p
ord.
38
allarg.
7
a tempo
cresc.
f
mf
mp

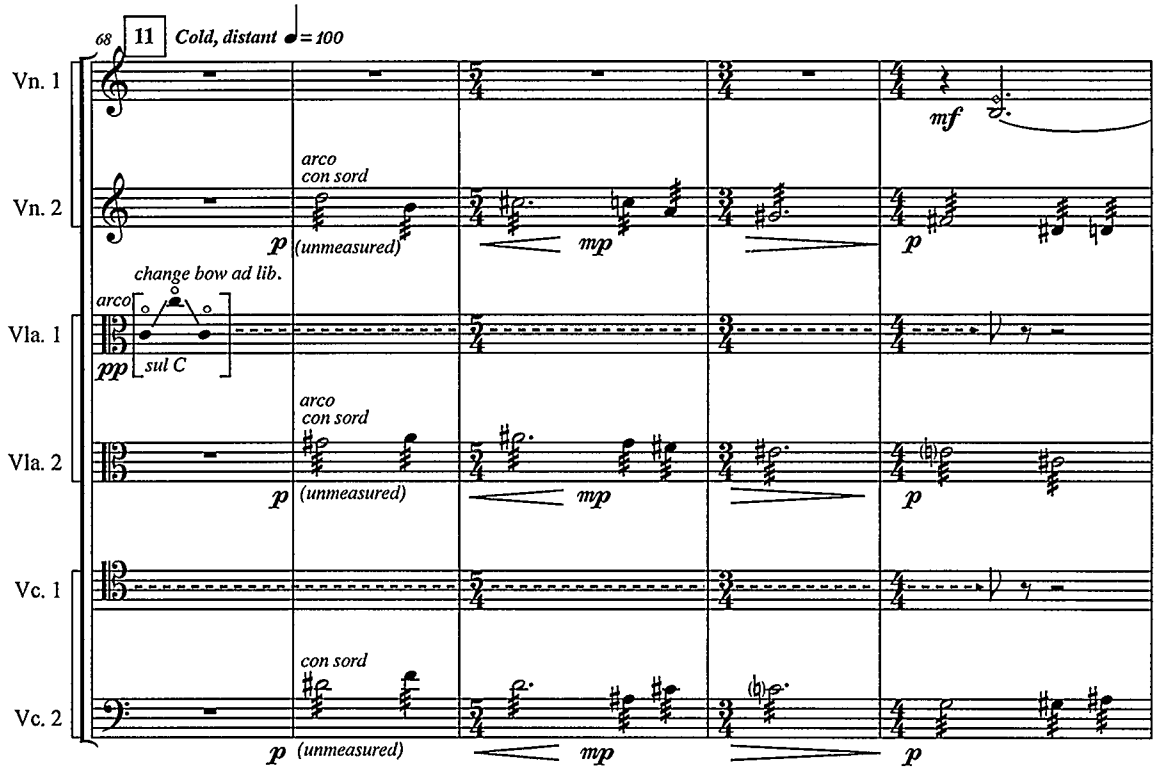

43
allarg.
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
f
mp
8
Meno mosso
cantabile
= 72
48
p

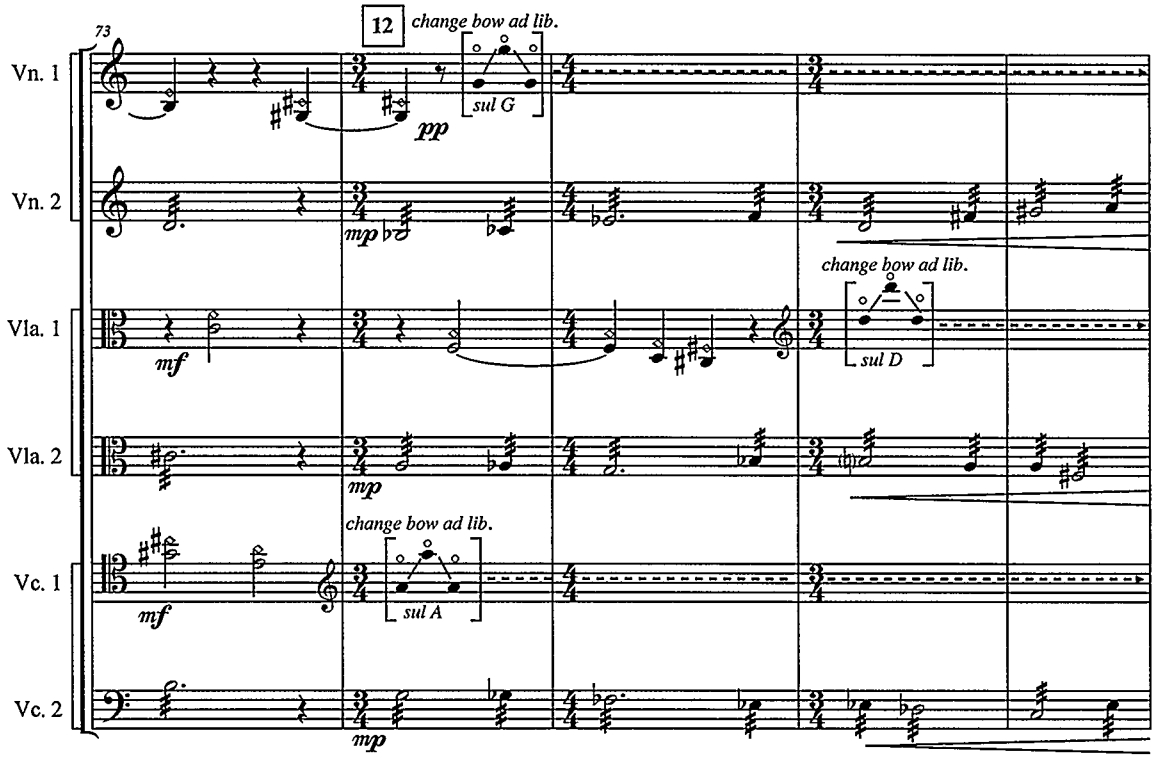

52
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mp
f
p
mf
ff
9
= 66
55
pp

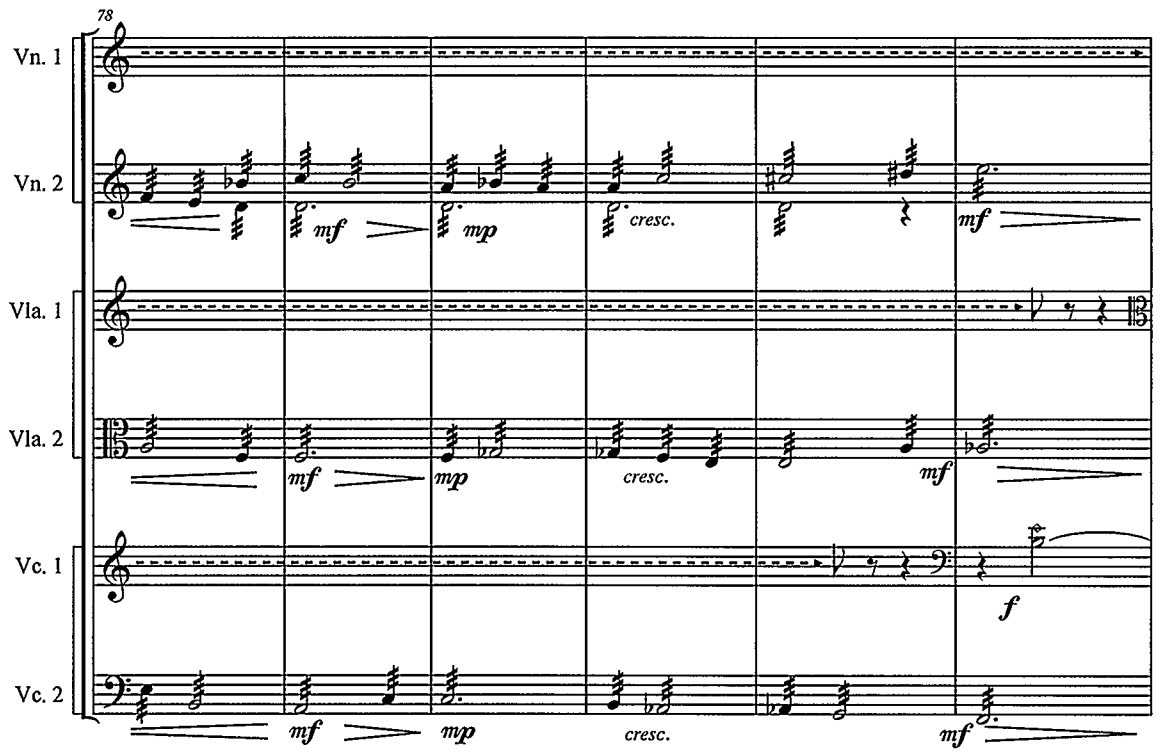

10
58
arco
sul pont
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
pizz
f
mf
mp

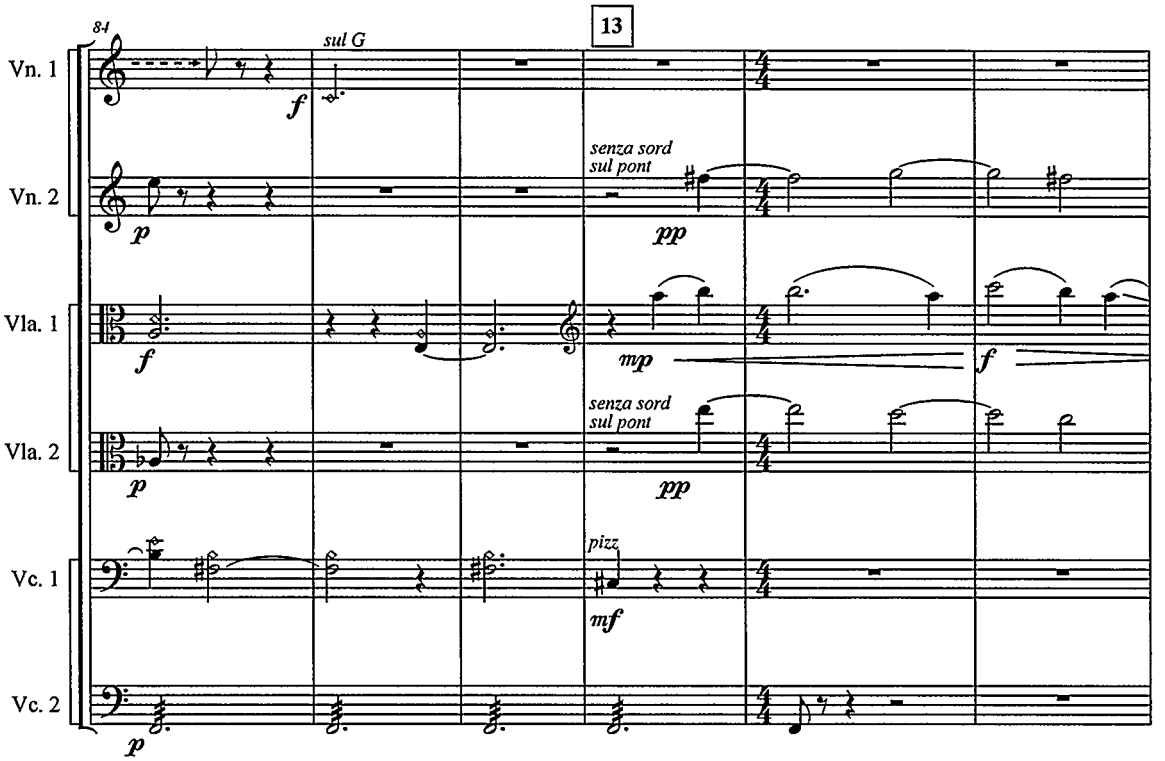

61
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
mp
pp

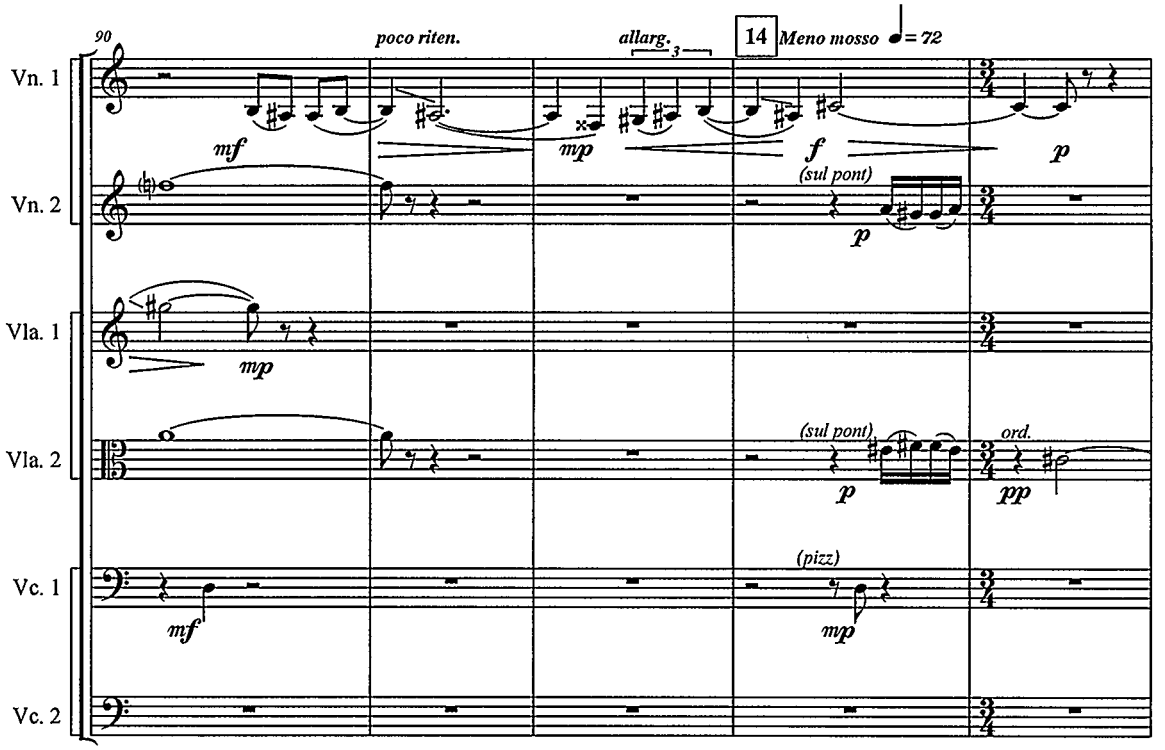

64
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
pizz
mp
mf
change bow ad lib.
sul D
pp

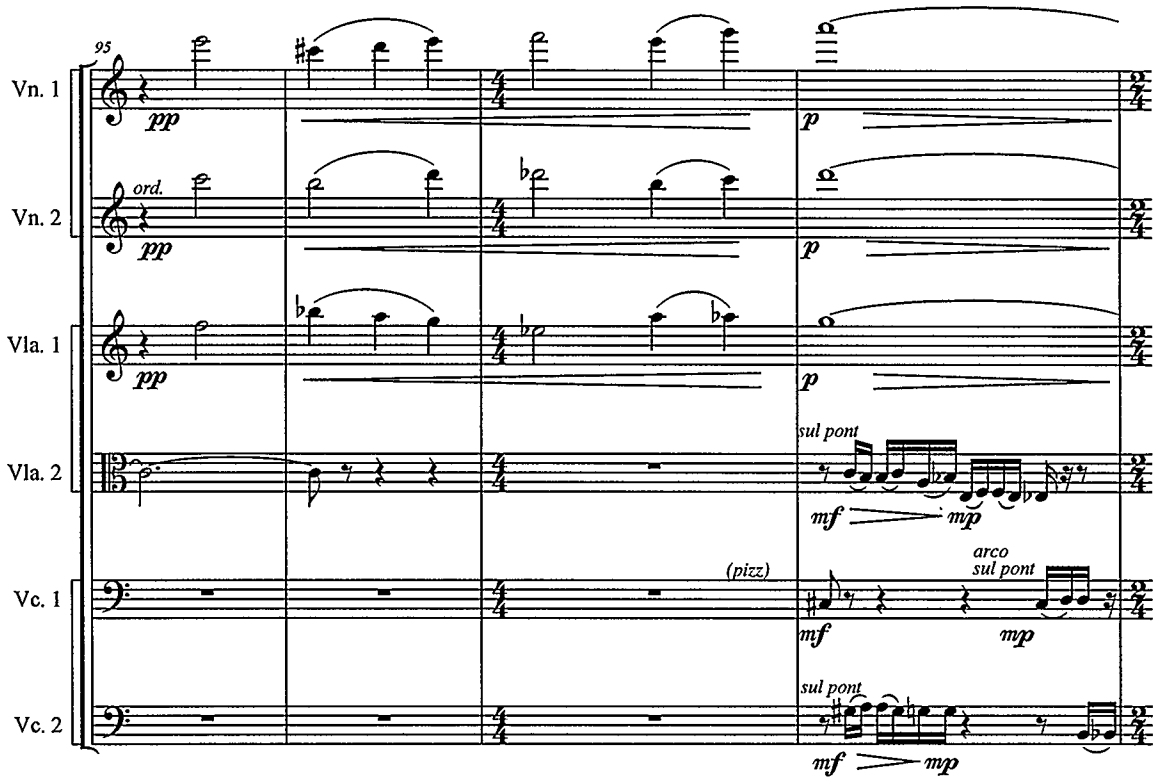

68
11
Cold, distant ♩= 100
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
arco
con sord
(unmeasured)
change bow ad lib.
sul C
p
mp
mf
pp

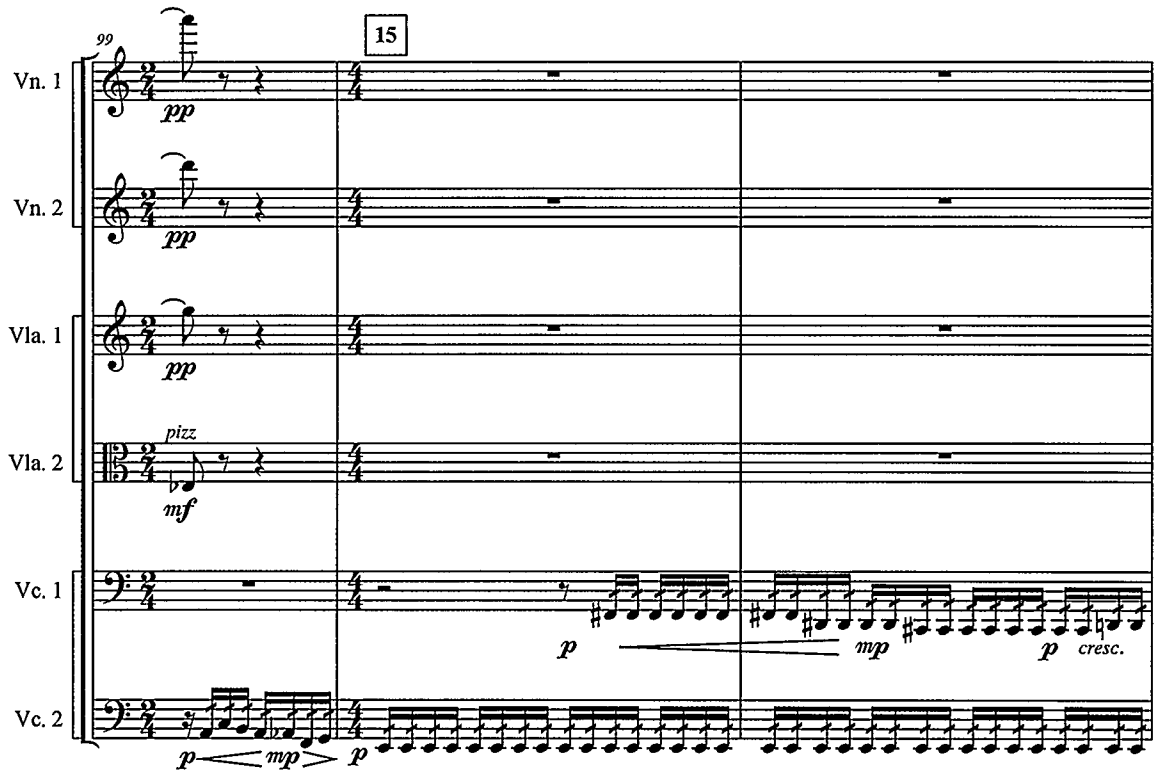

73
12
change bow ad lib.
sul G
pp
Vn. 1
Vn. 2
mp
Vla. 1
mf
change bow ad lib.
sul D
Vla. 2
mp
change bow ad lib.
Vc. 1
mf
sul A
Vc. 2
mp

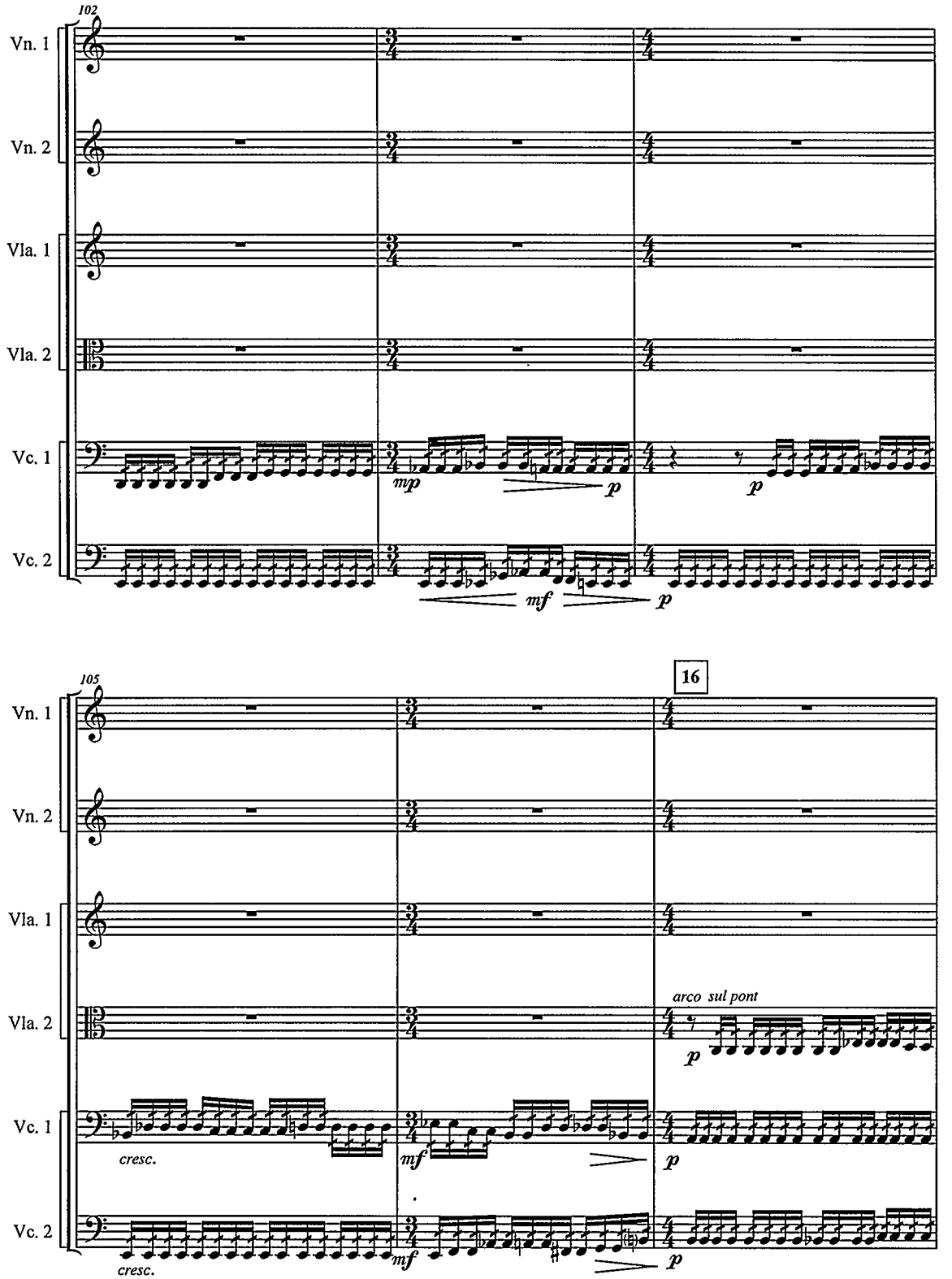

78
Vn. 1
Vn. 2
mf
mp
cresc.
mf
Vla. 1
Vla. 2
mf
mp
cresc.
mf
Vc. 1
f
Vc. 2
mf
mp
cresc.
mf

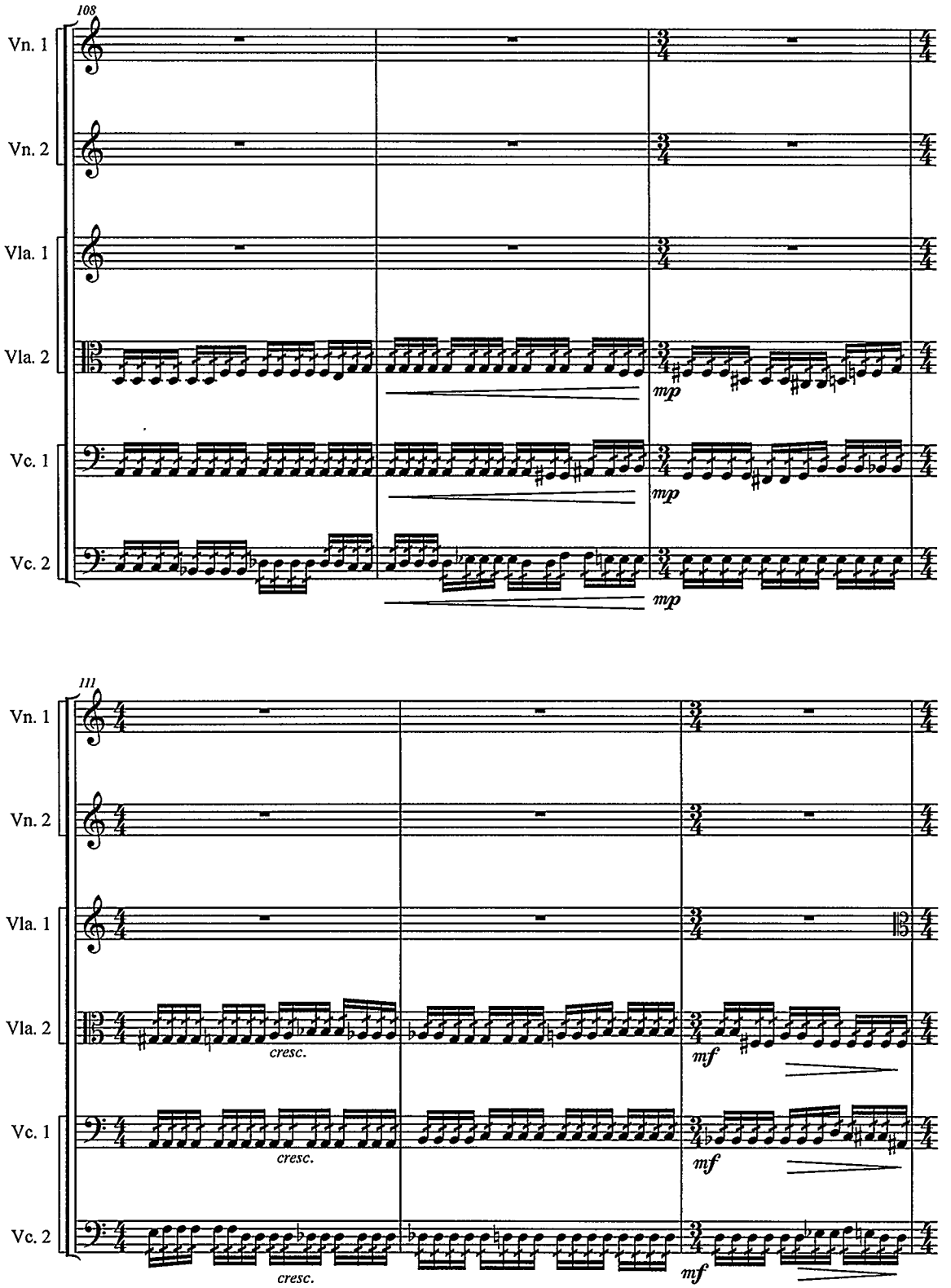

84
13
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
sul G
f
senza sord
sul pont
pp
p
mp
pizz
mf

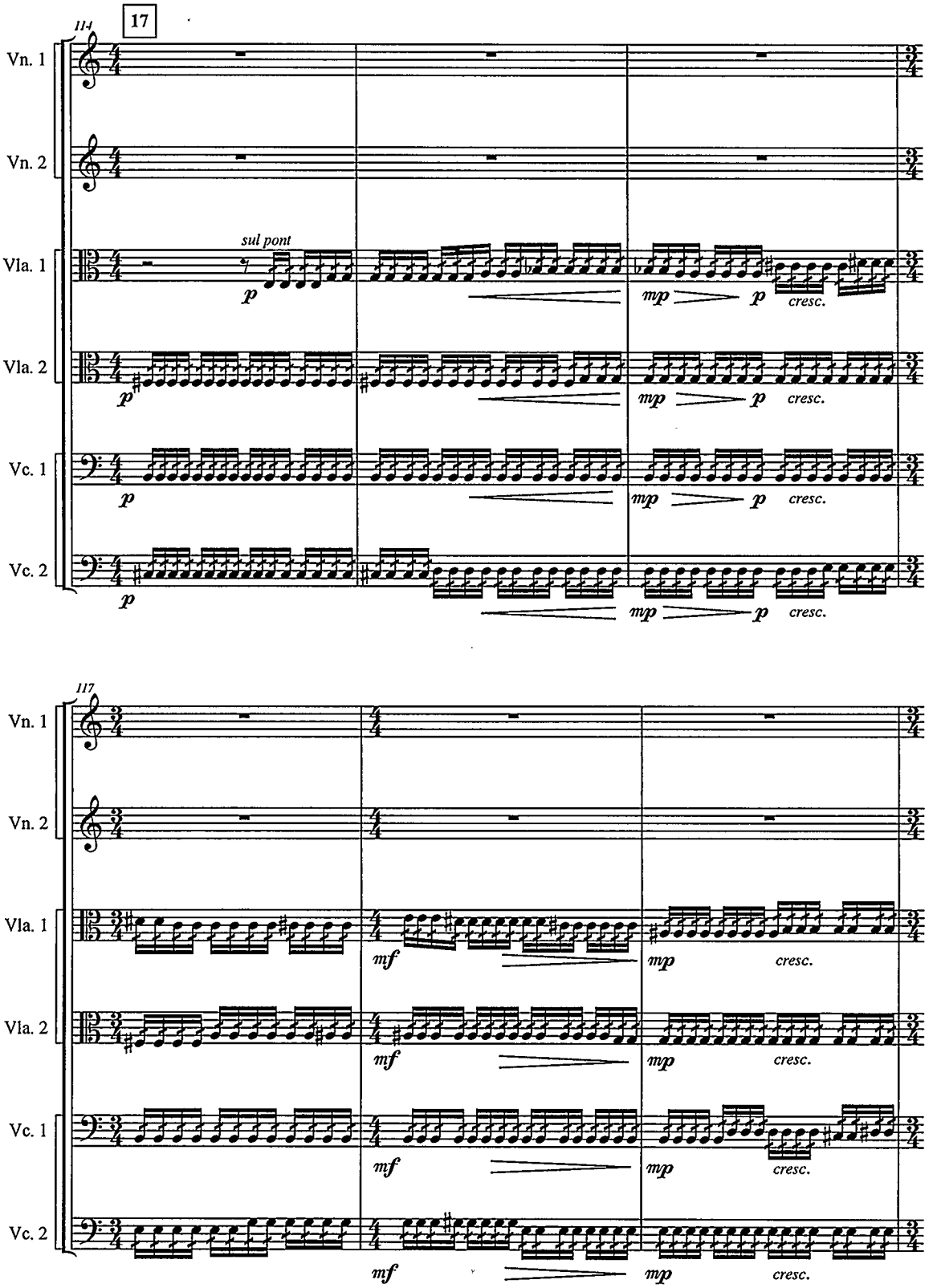

90
poco riten.
allarg.
3
14
Meno mosso
= 72
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
mp
f
p
(sul pont)
ord.
pp
(pizz)

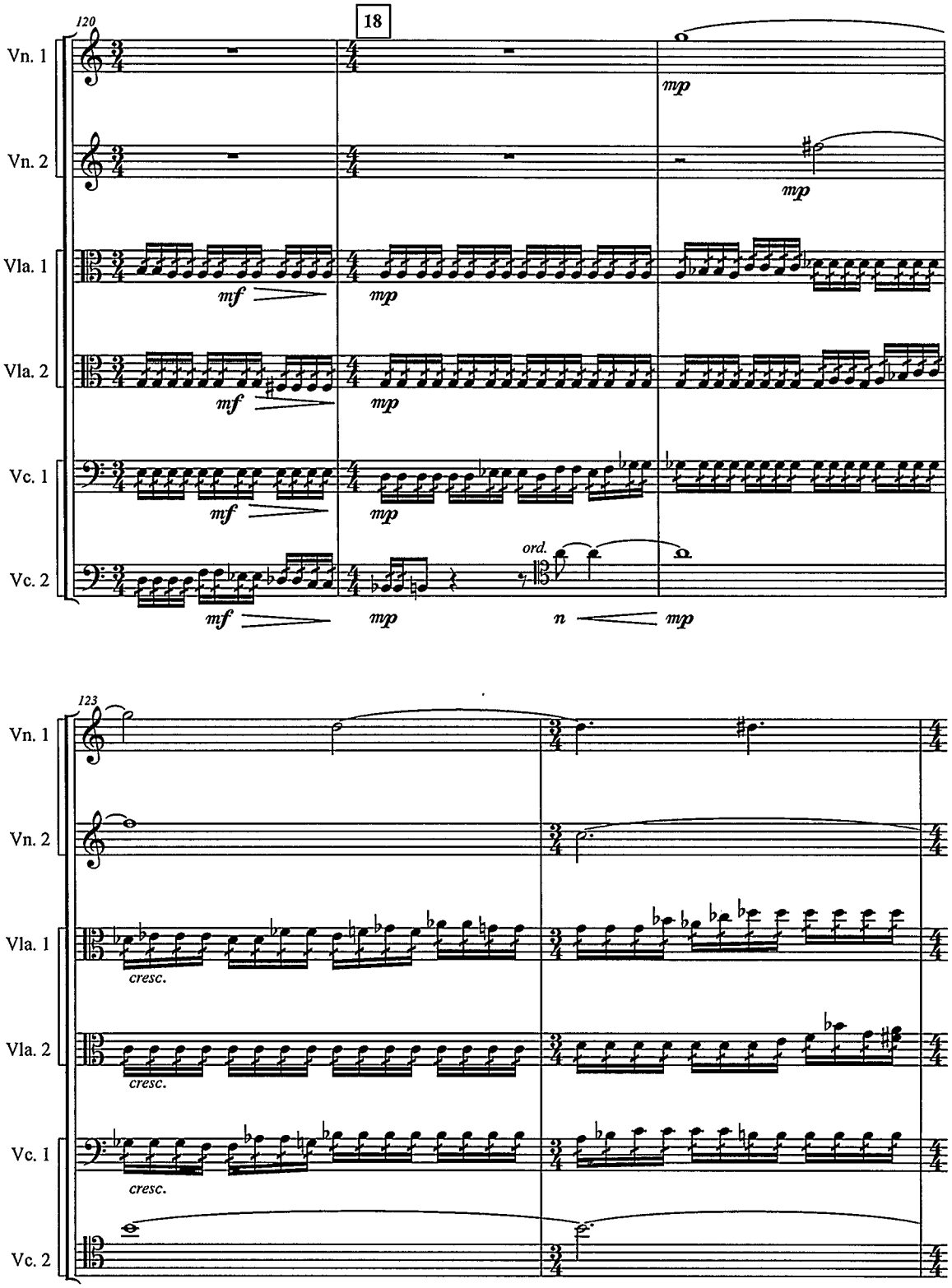

95
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
pp
ord.
p
sul pont
mf
mp
(pizz)
arco
sul pont

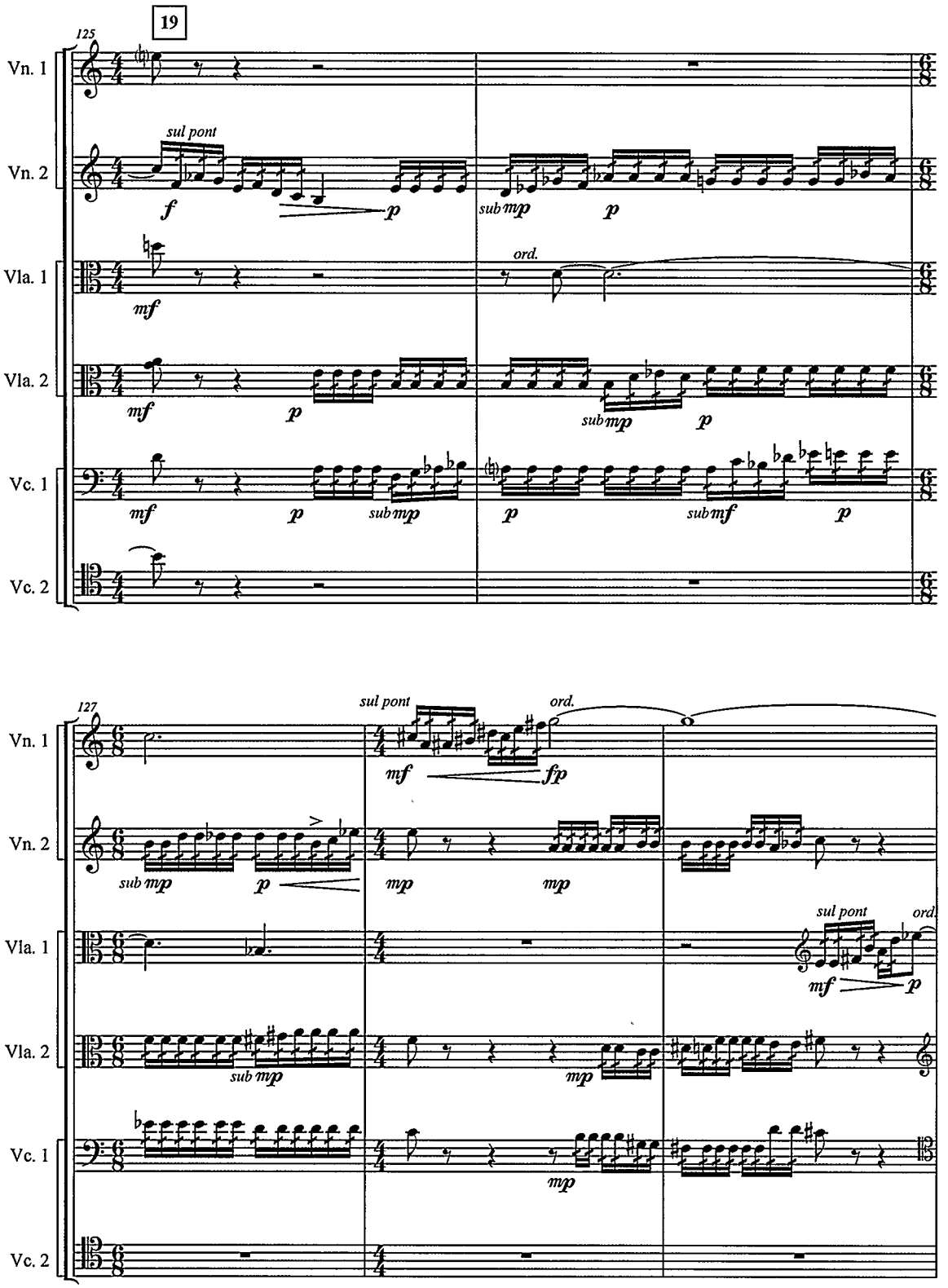

99
15
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
pp
pizz
mf
p
mp
cresc.

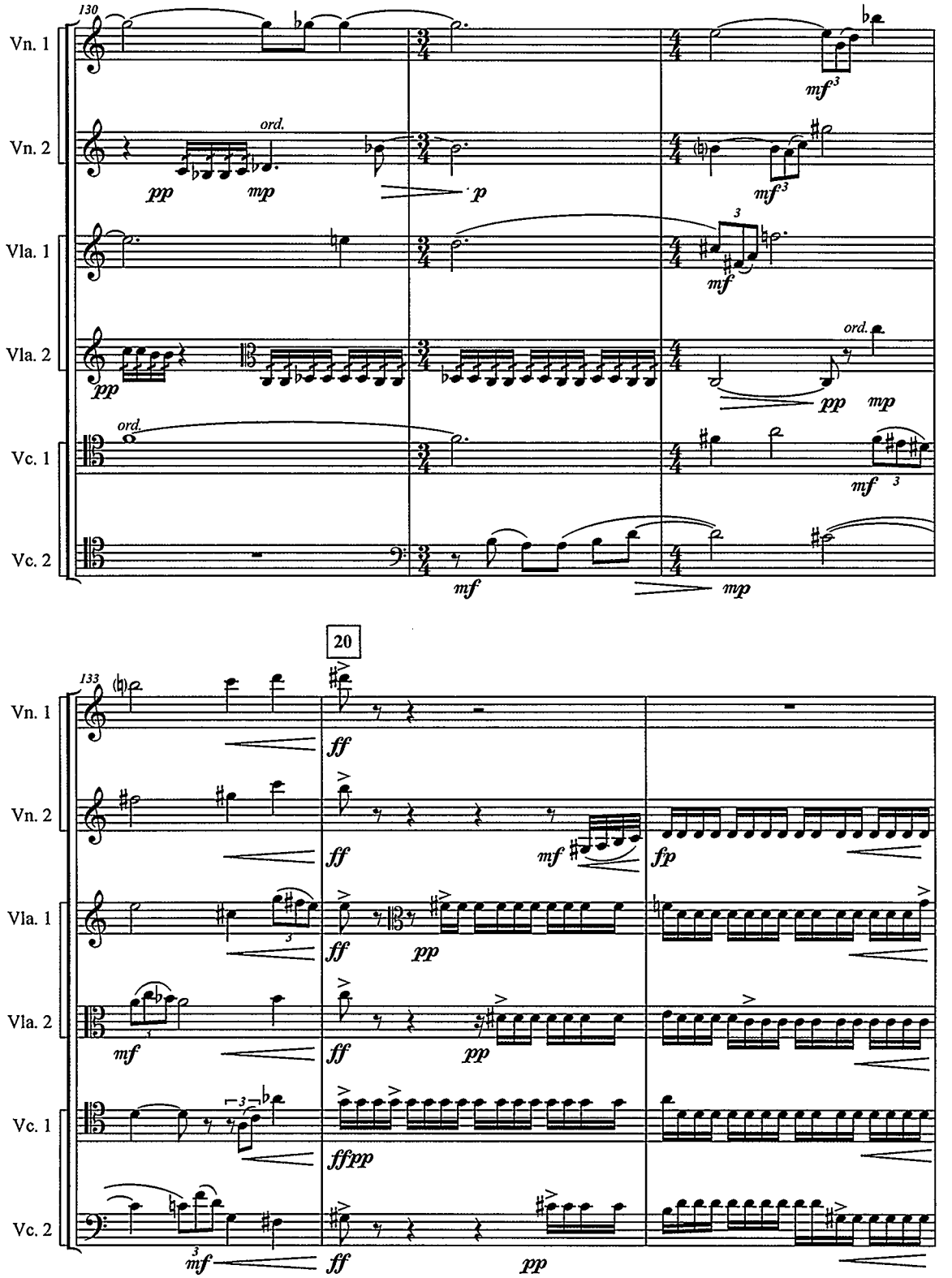

102
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mp
p
p
mf
p
105
16
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
arco sul pont
p
cresc.
mf
p
cresc.
mf
p

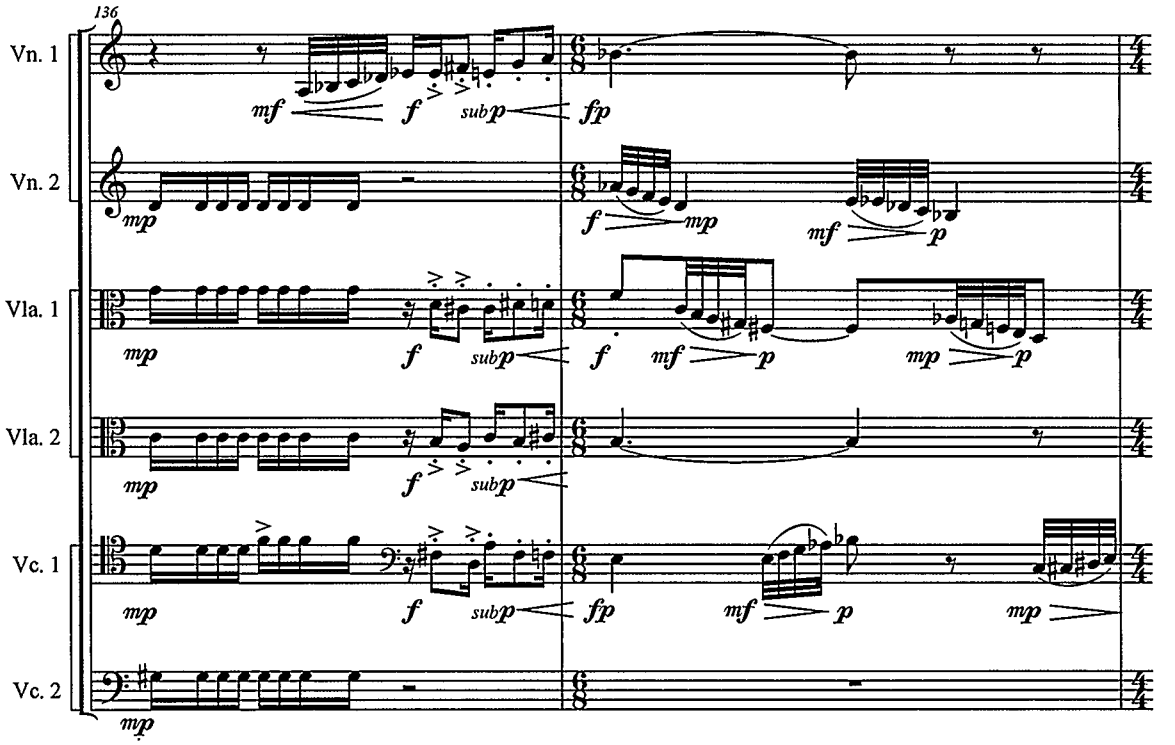

108
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mp
mp
mp
111
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
cresc.
cresc.
cresc.
mf
mf
mf

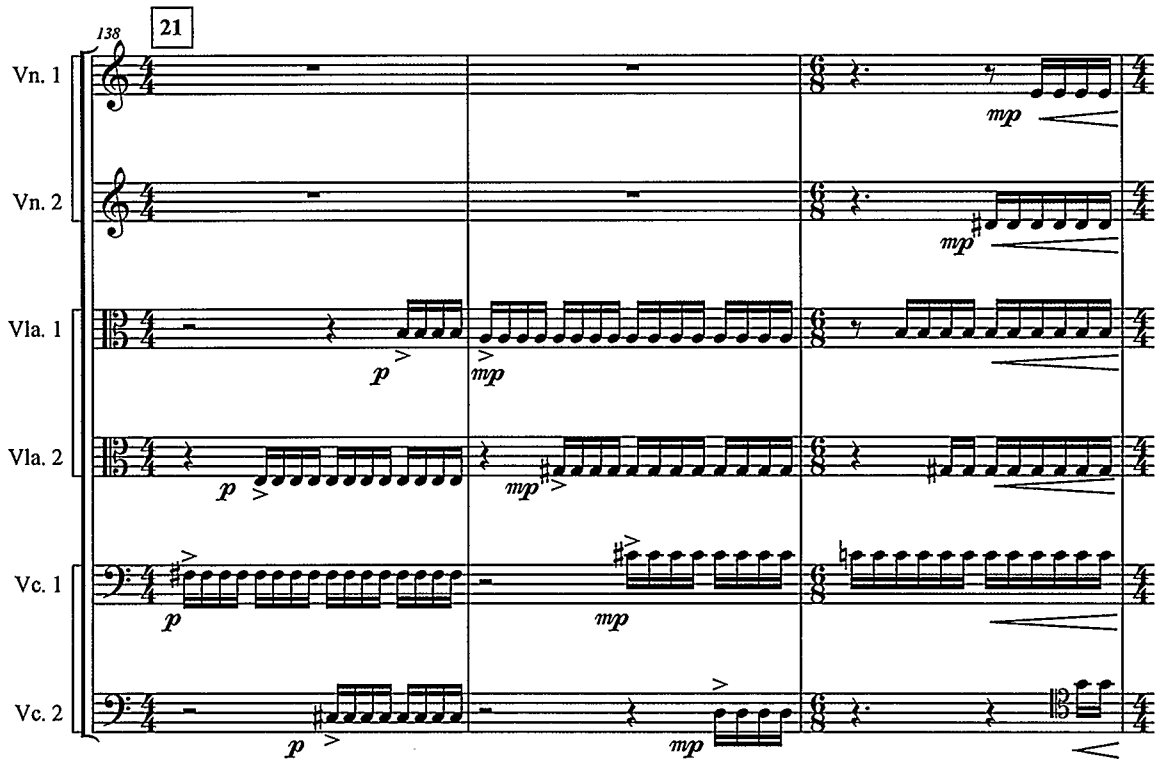

114
17
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
sul pont
p
mp
cresc.
117
mf

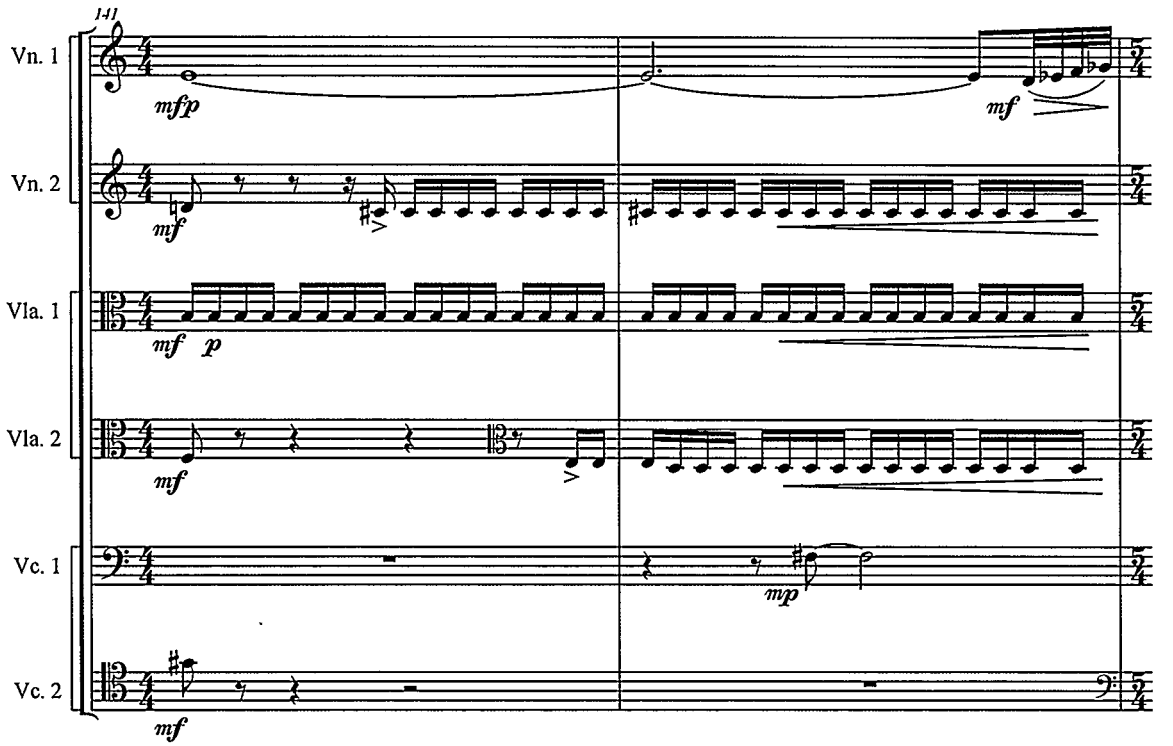

120
18
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
mp
ord.
n
123
cresc.

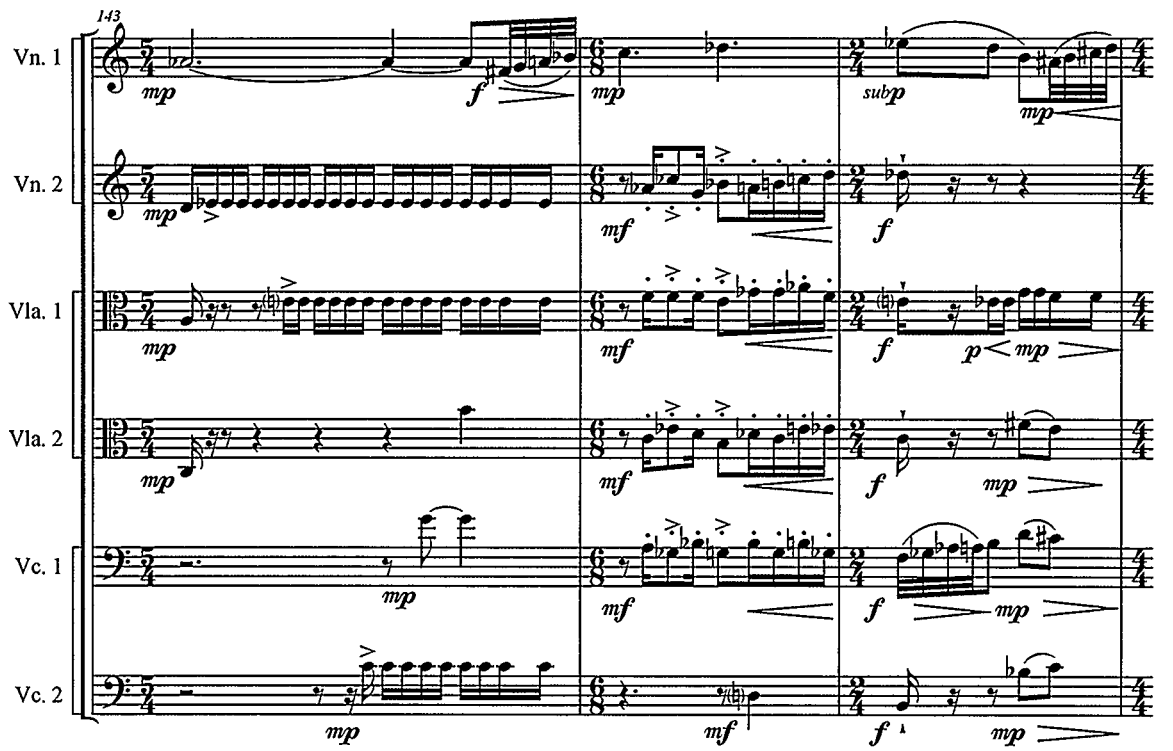

19
125
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
sul pont
ord.
127
sub mp
sub mf

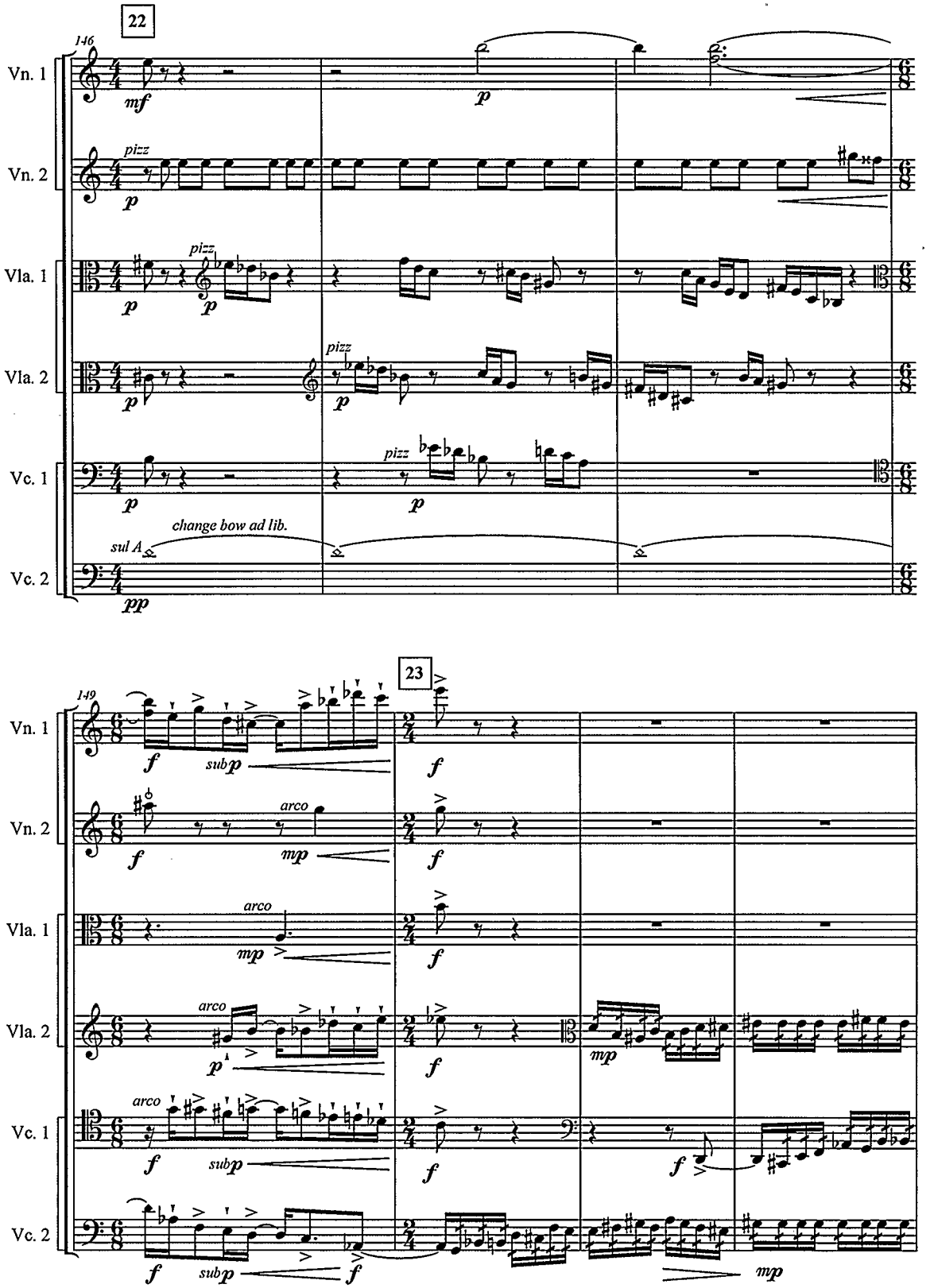

130
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
ord.
pp
mp
p
mf
3
20
133
ff
fp
ffpp

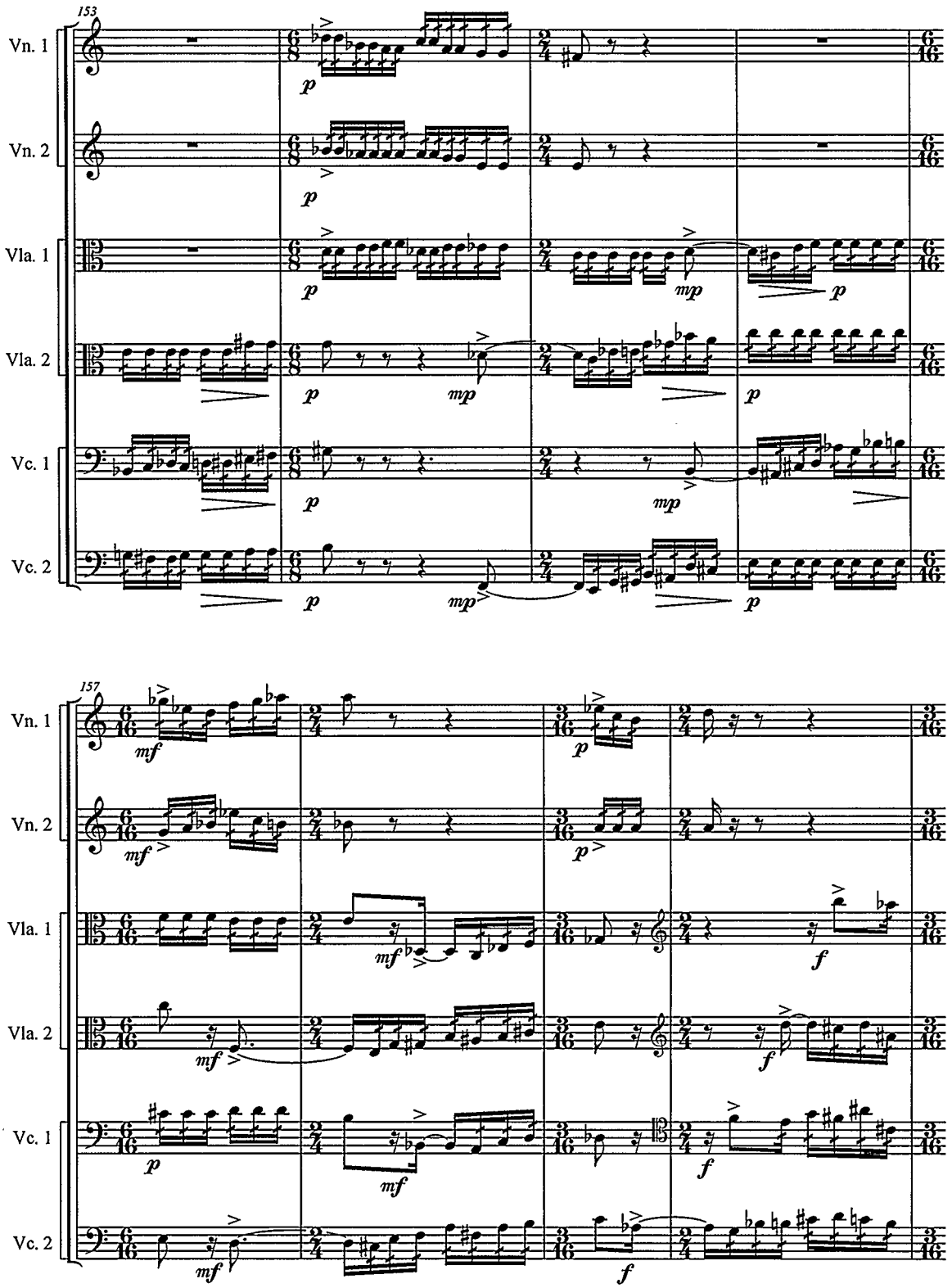

136
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
f
subp
fp
mp
p

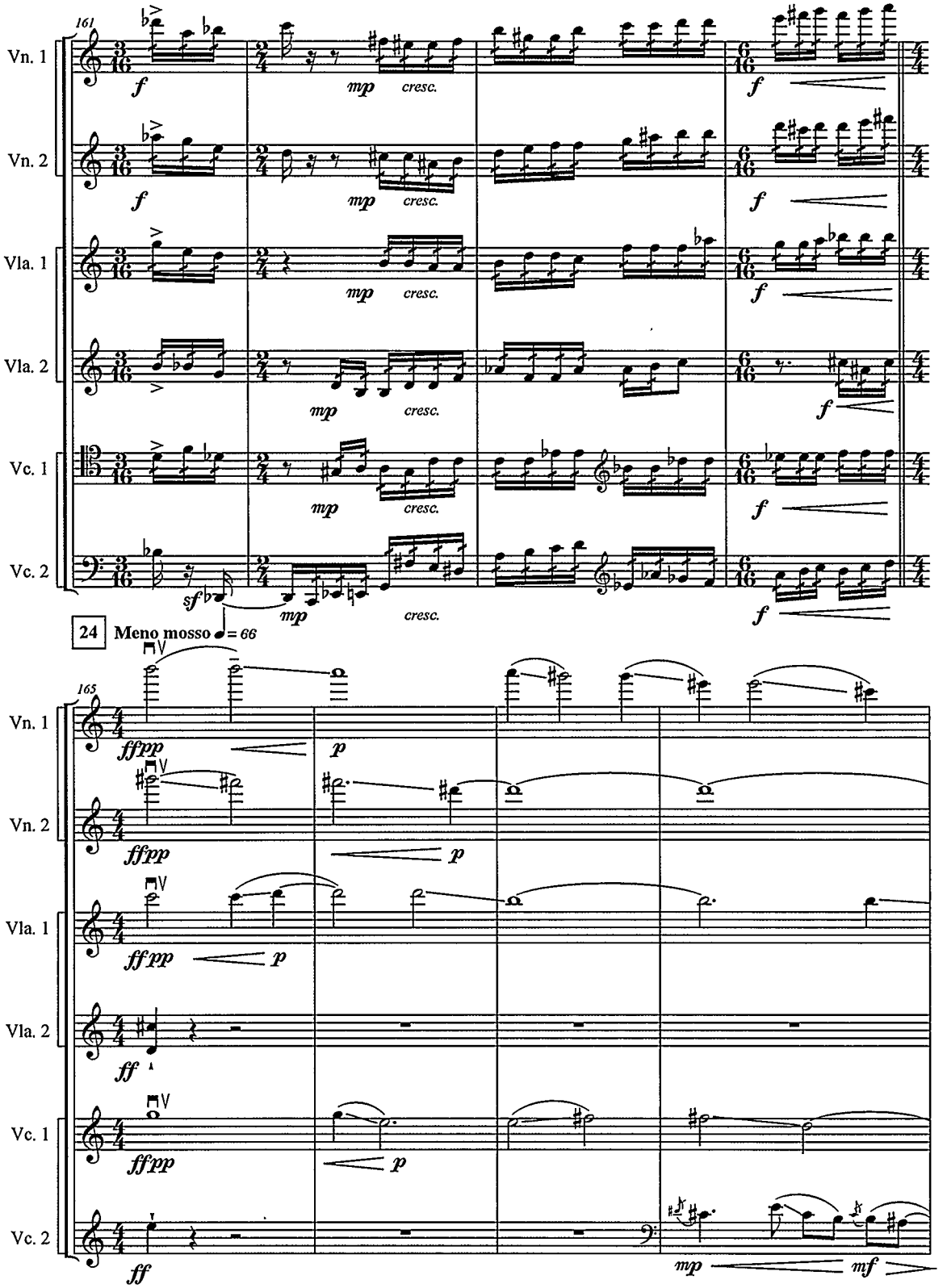

138
21
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
p
mp

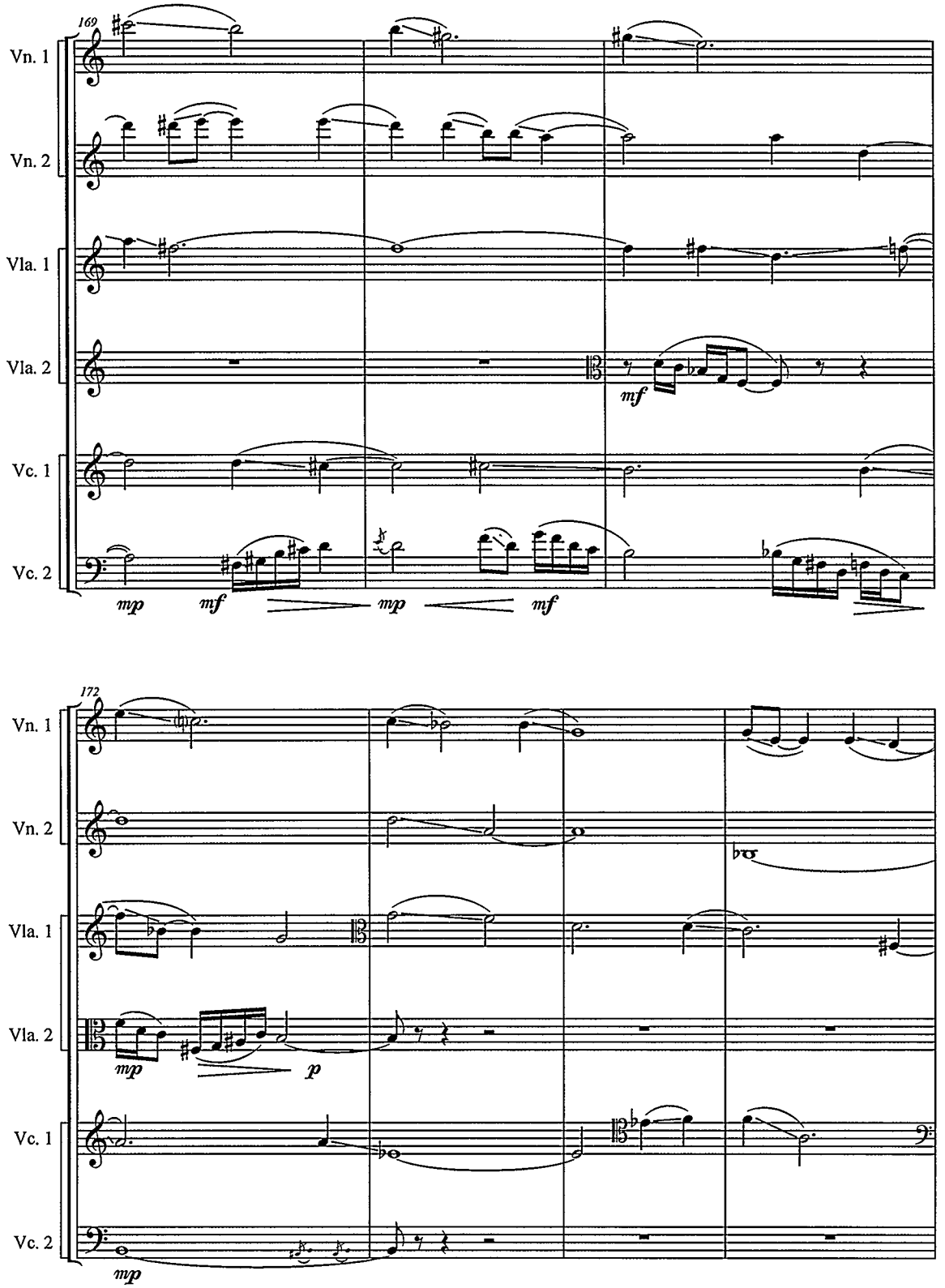

141
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mfp
mf
p
mp

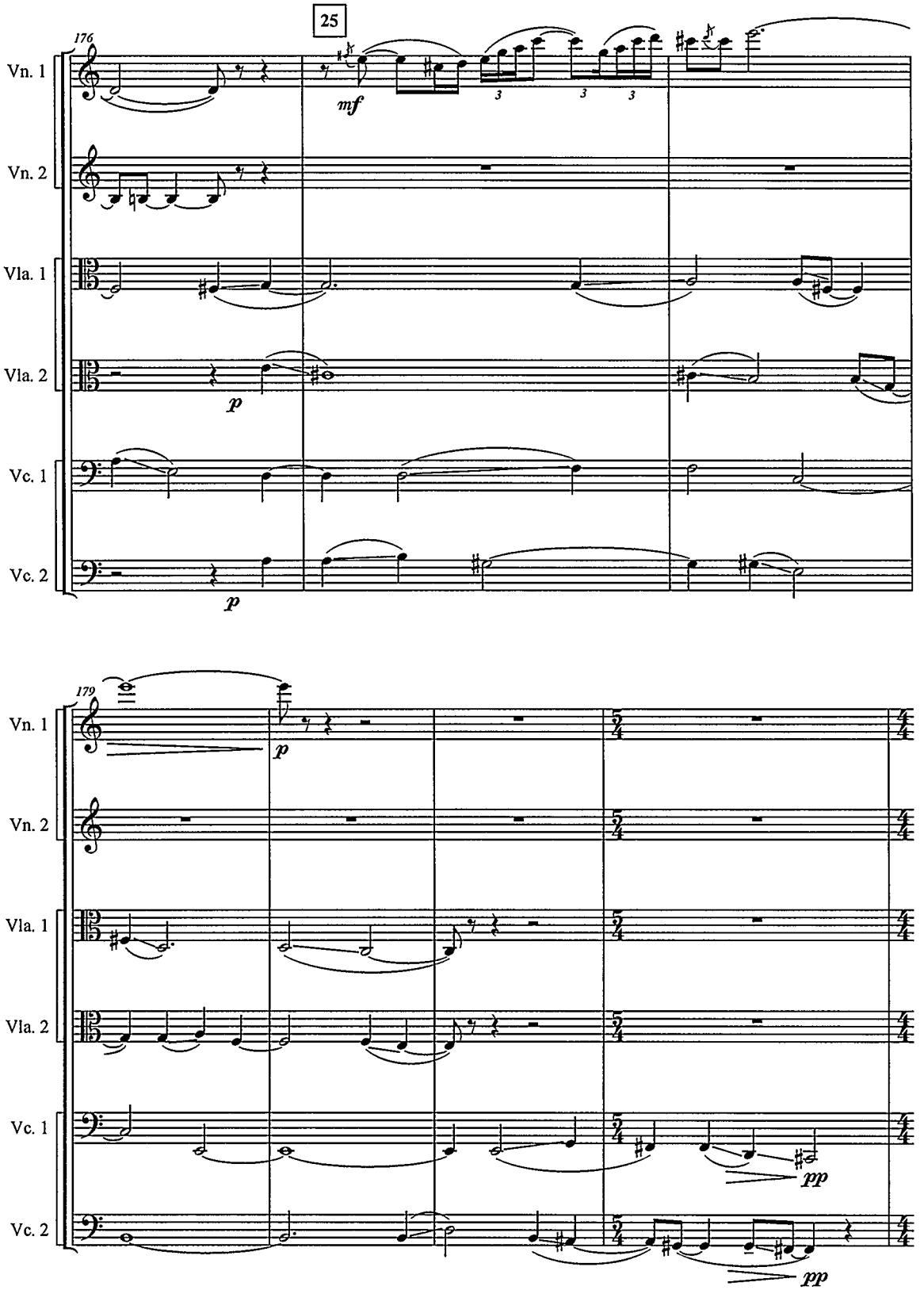

143
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mp
f
mf
subp
p

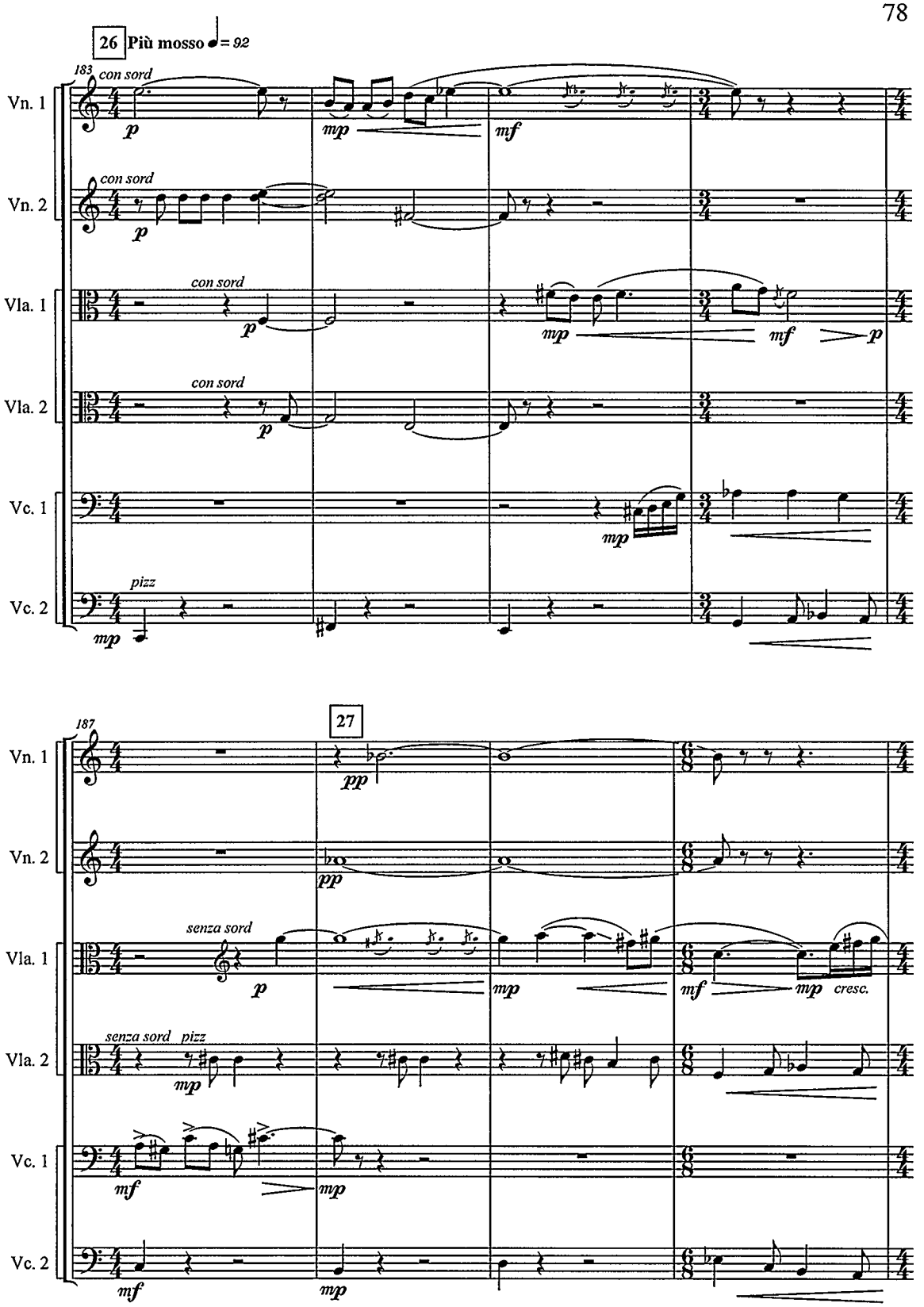

22
146
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
p
pizz
change bow ad lib.
sul A
pp
23
149
f
subp
arco
mp

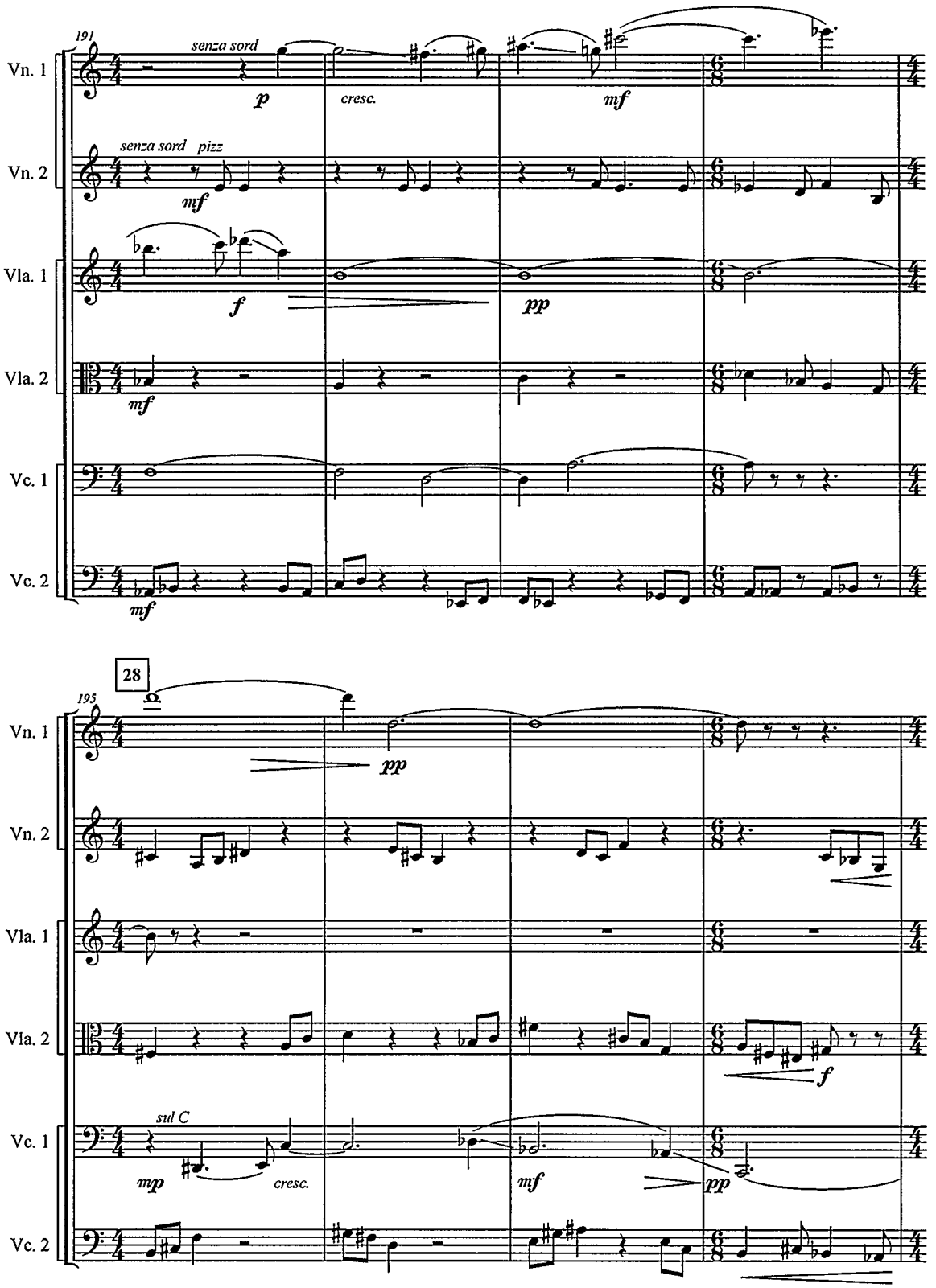

153
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
p
mp
157
mf
f

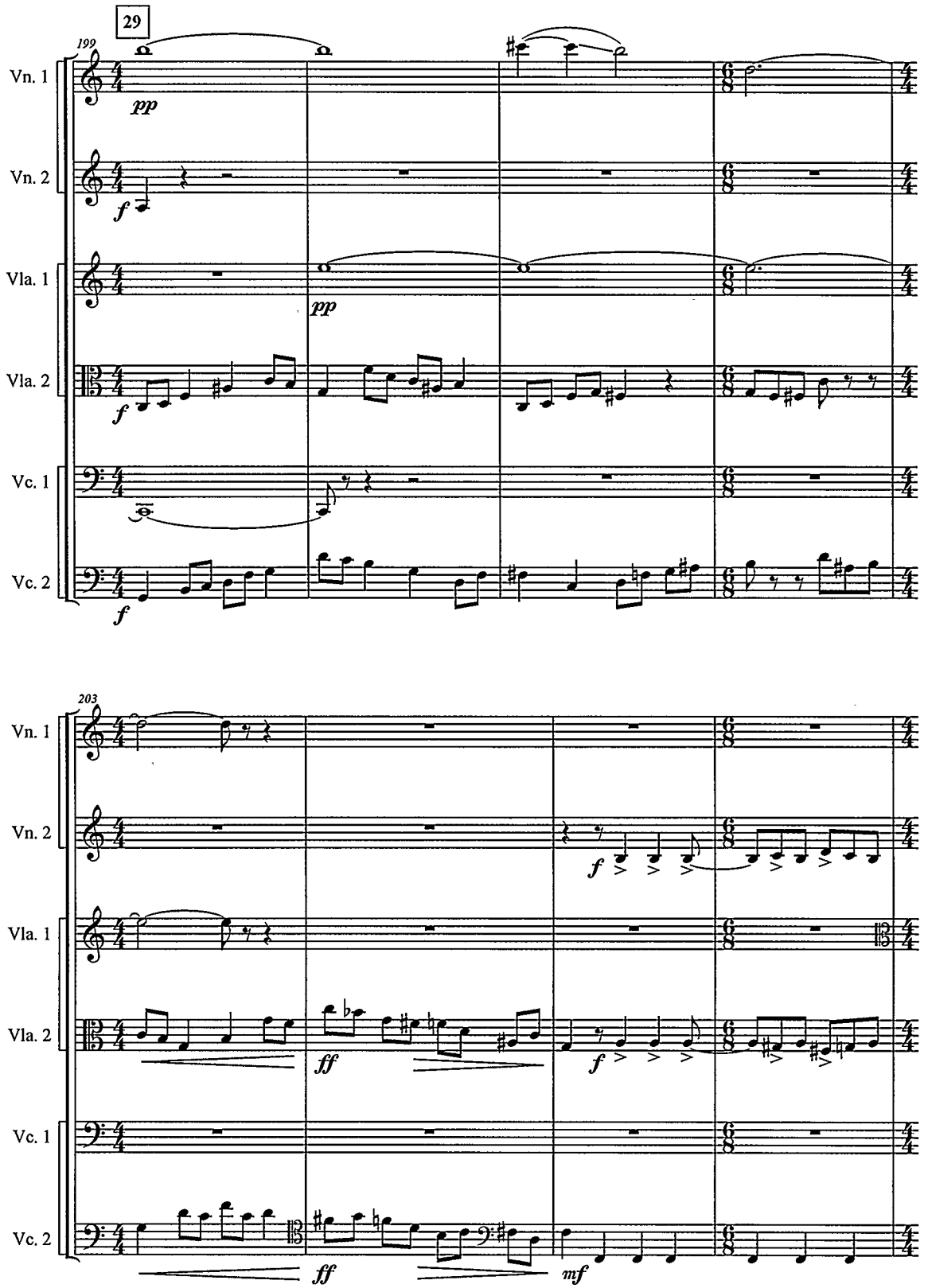

161
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
f
mp
cresc.
sf
24
Meno mosso
= 66
165
ffpp
p
ff
mf

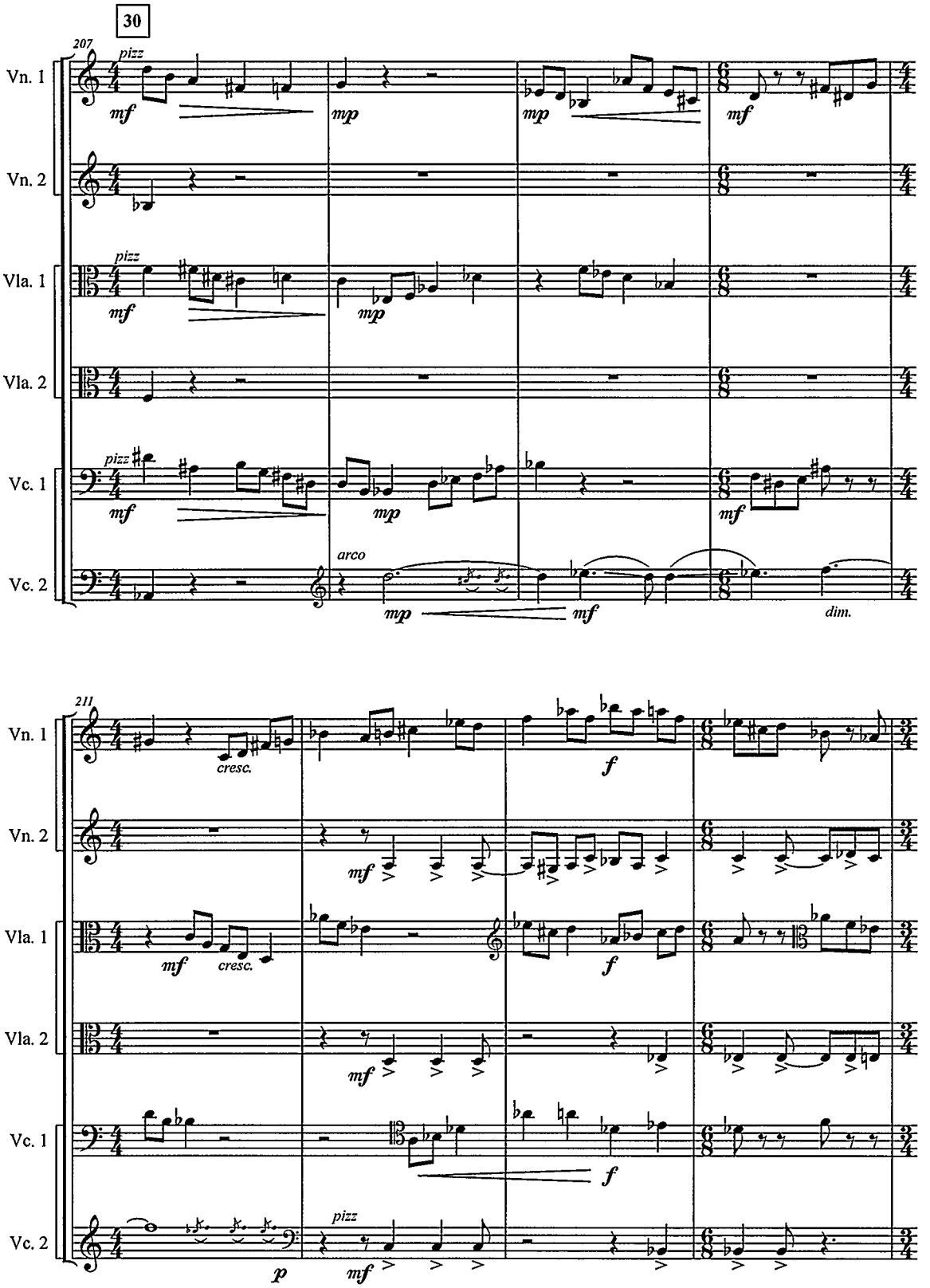

169
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
mp
mf
mp
mf
172
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mp
p
mp

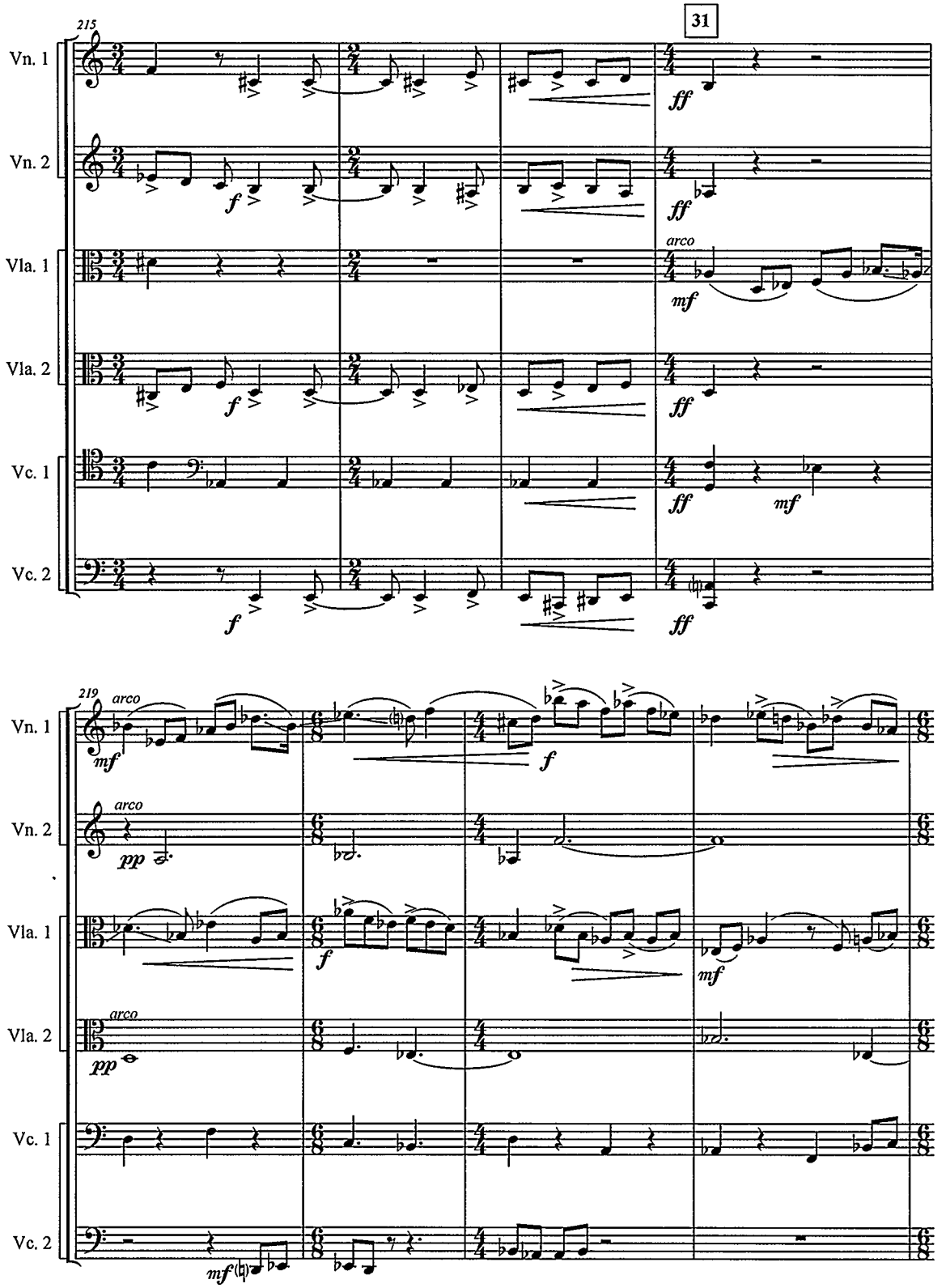

176
25
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
p
p
179
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
p
pp
pp

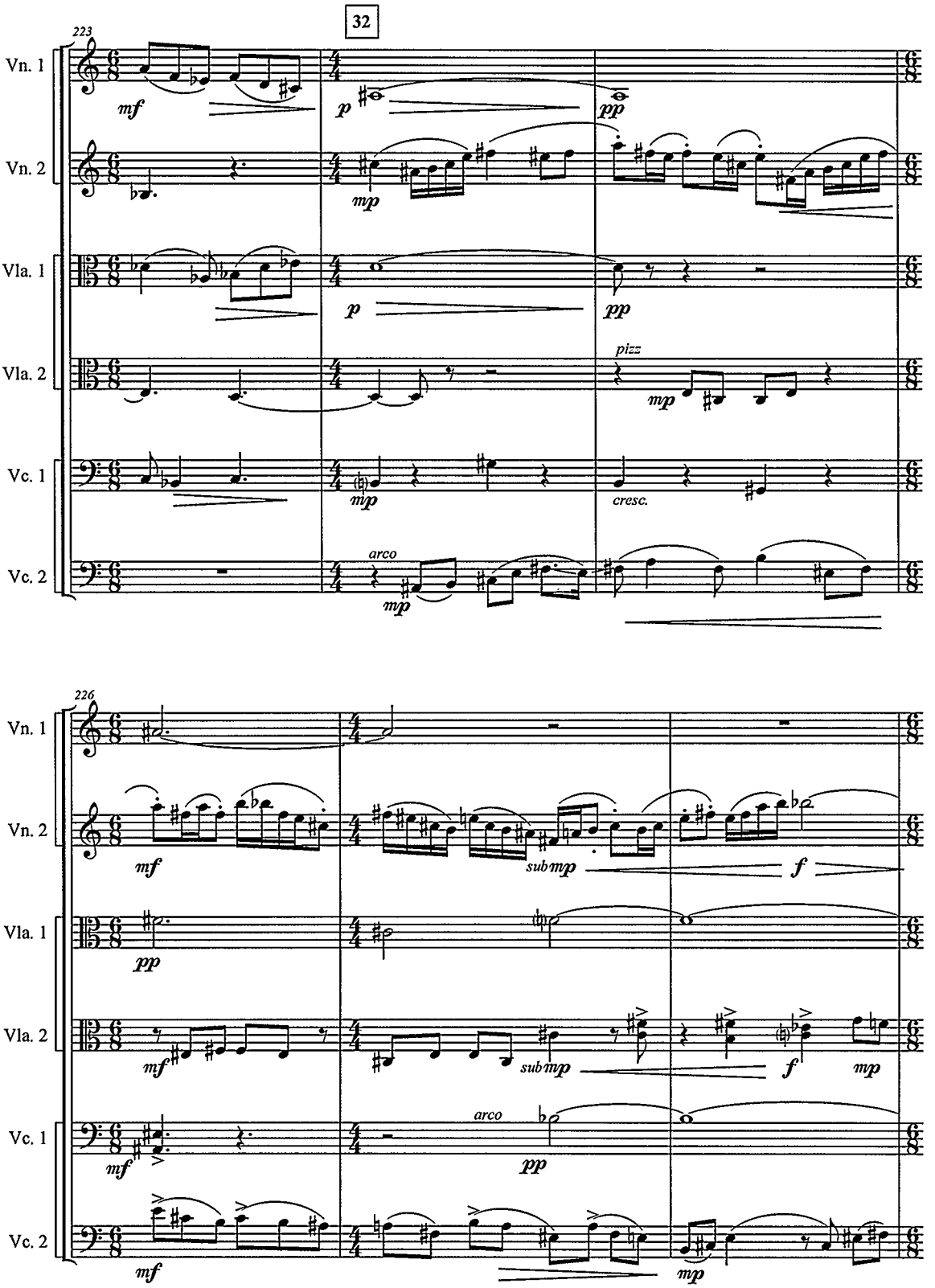

26 Più mosso ♩= 92
183
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
con sord
pizz
senza sord
27
187
cresc.

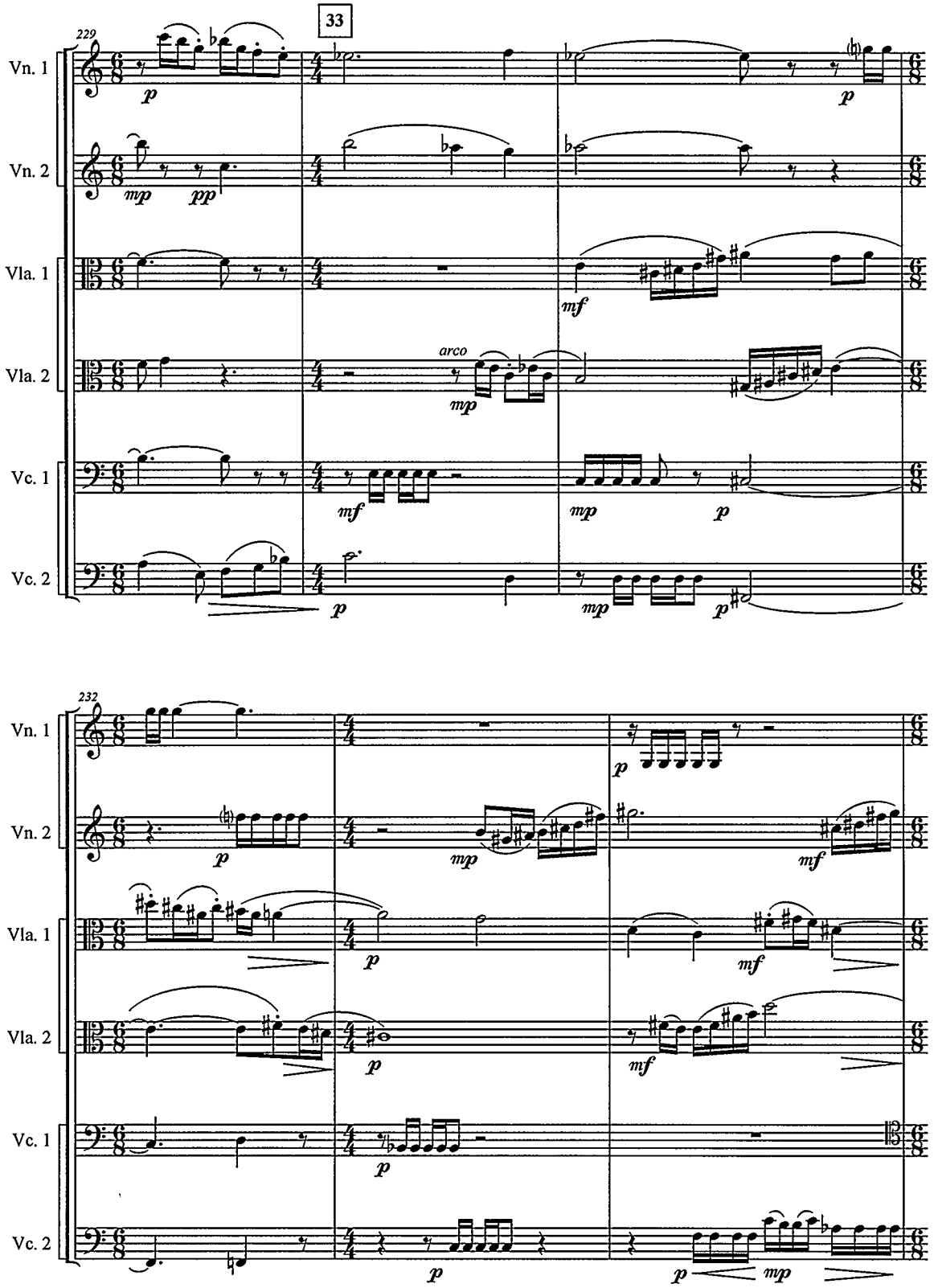

191
Vn. 1
senza sord
p
cresc.
mf
Vn. 2
senza sord pizz
mf
Vla. 1
f
pp
Vla. 2
mf
Vc. 1
Vc. 2
mf
28
195
Vn. 1
pp
Vn. 2
Vla. 1
Vla. 2
f
Vc. 1
sul C
mp
cresc.
mf
pp
Vc. 2

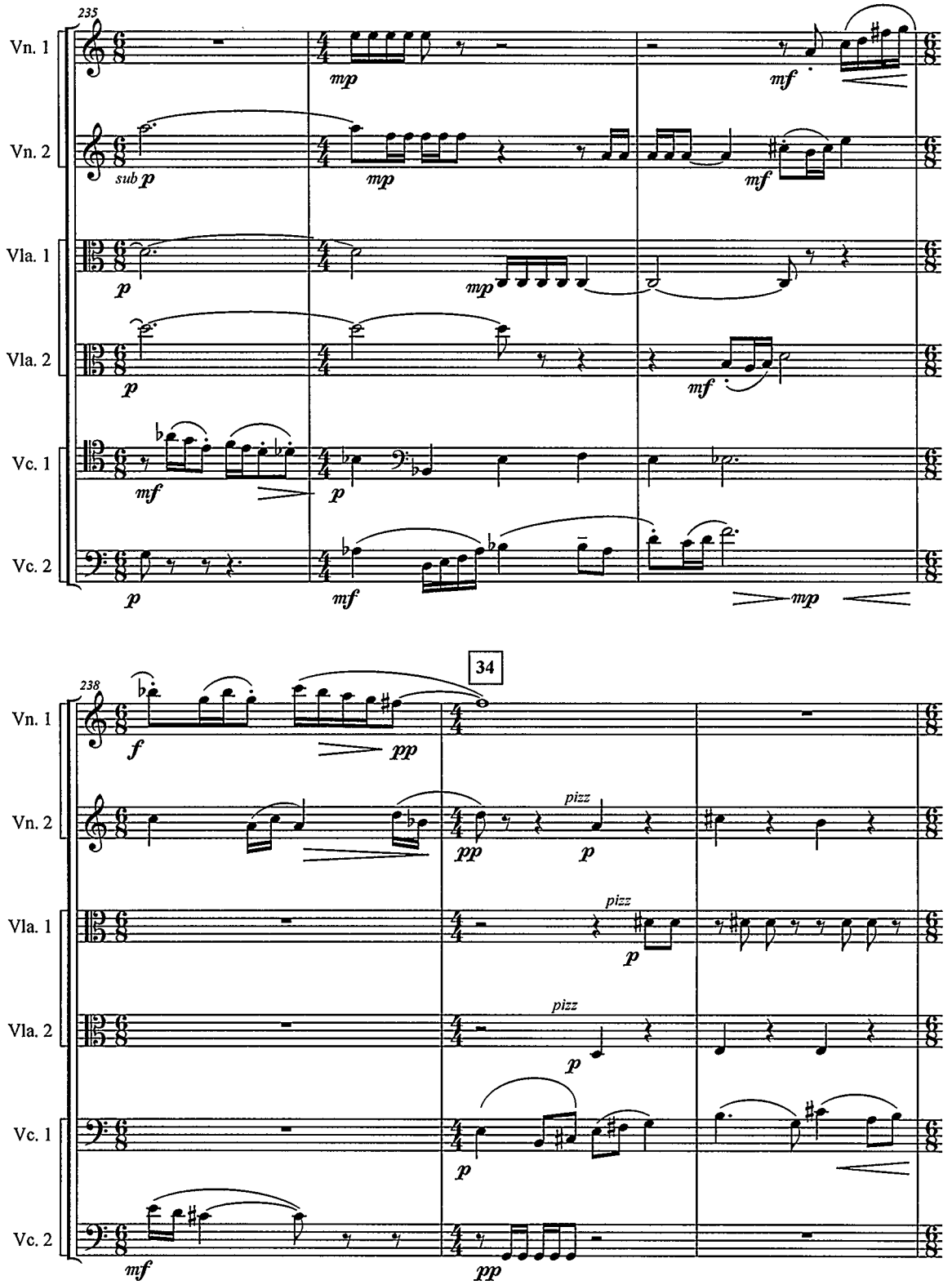

29
199
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
pp
f
pp
f
203
ff
f
ff
mf

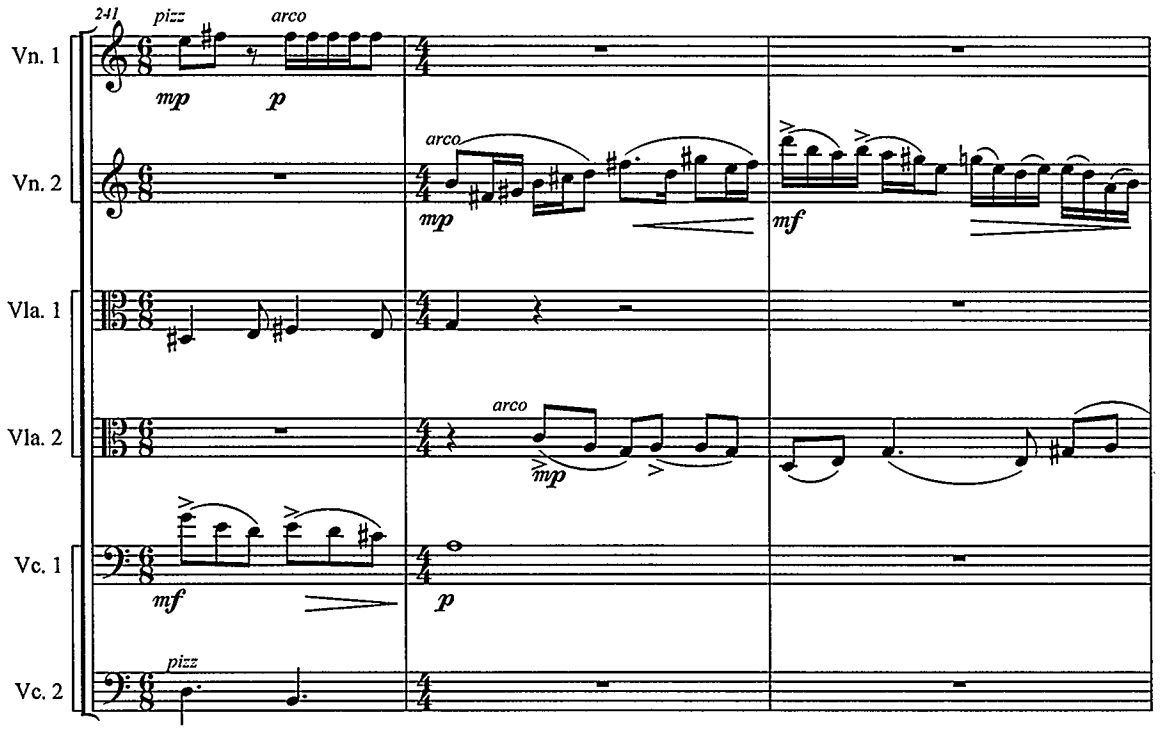

30
207
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
pizz
mf
mp
arco
dim.
211
cresc.
f
p

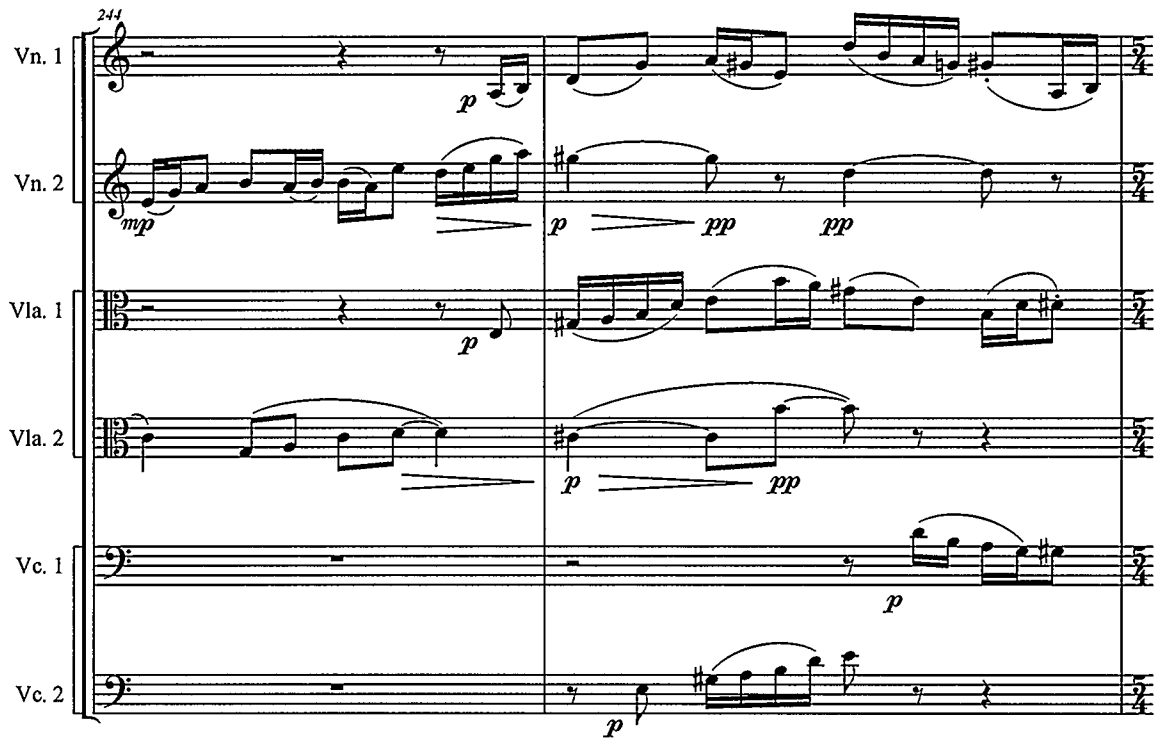

215
31
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
arco
219

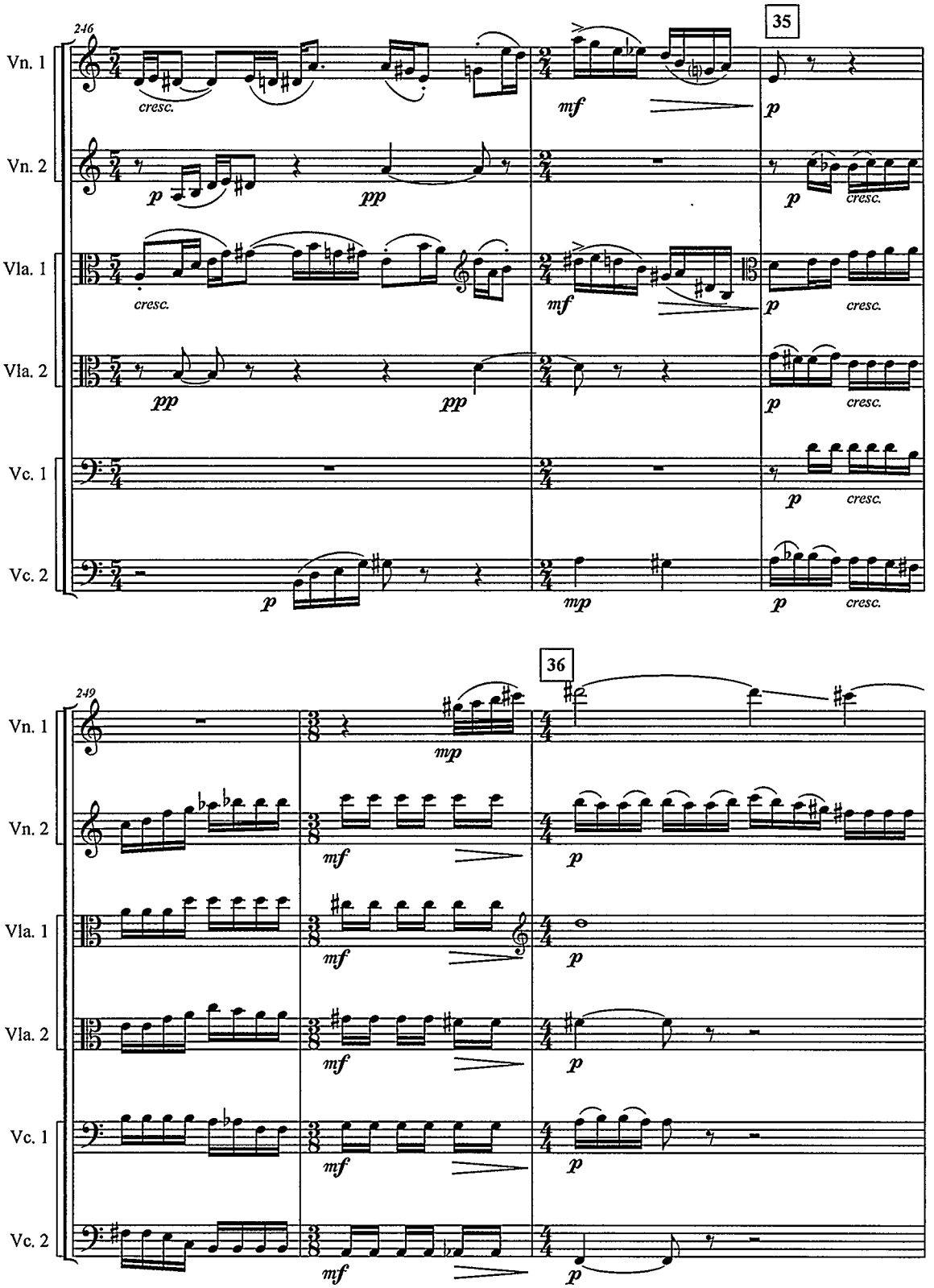

32
223
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
p
pp
mp
pizz
cresc.
arco
226
sub mp
f

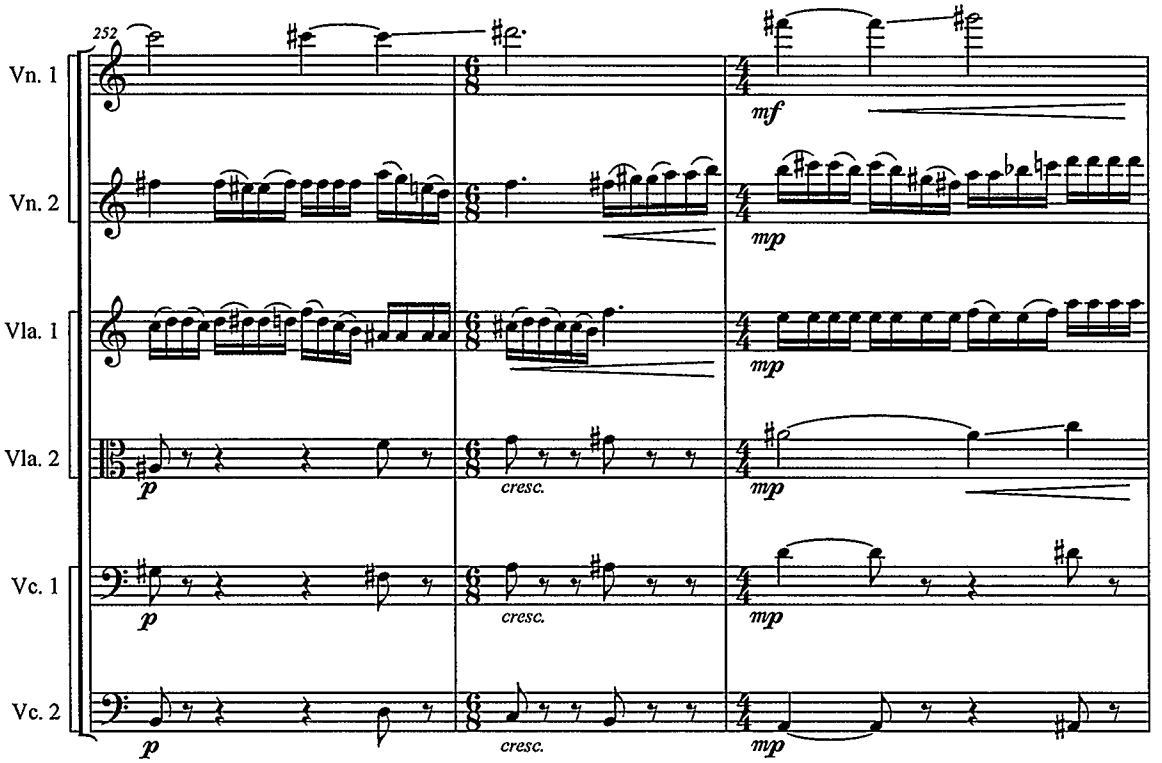

229
33
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
arco
232

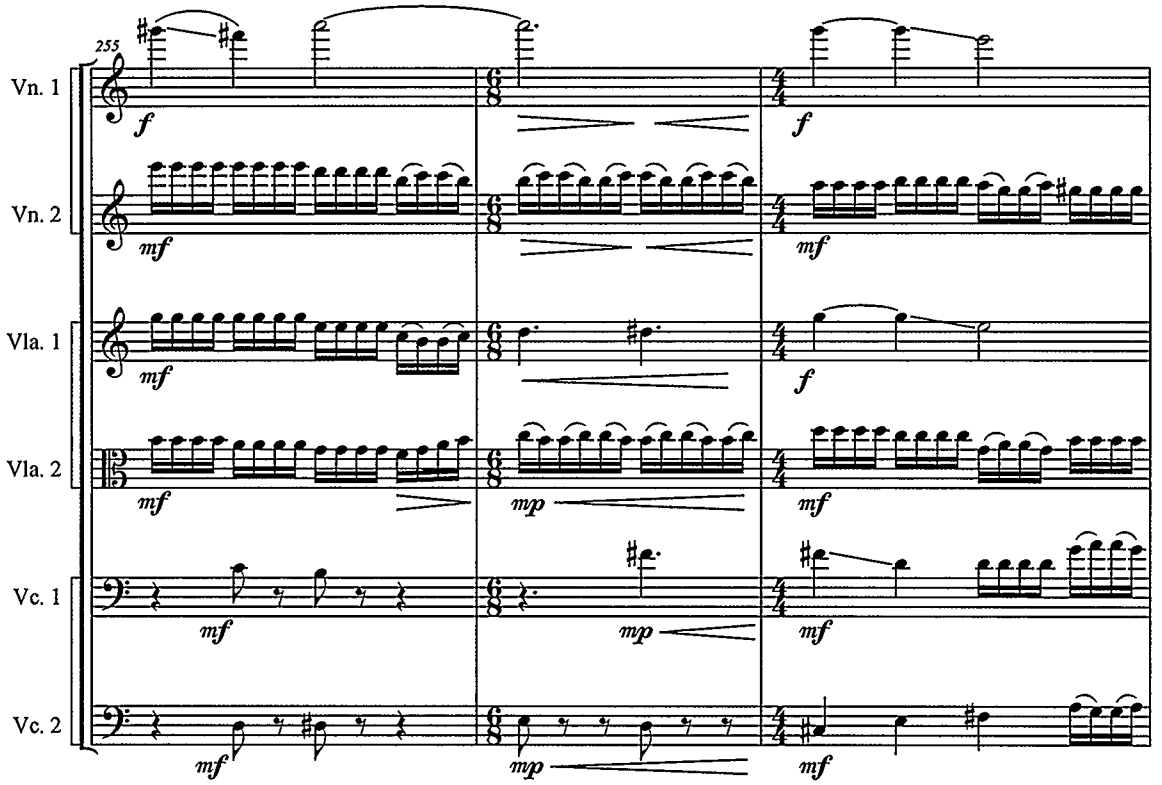

235
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
sub p
mp
mf
p
mf
mp
238
34
pp
pizz

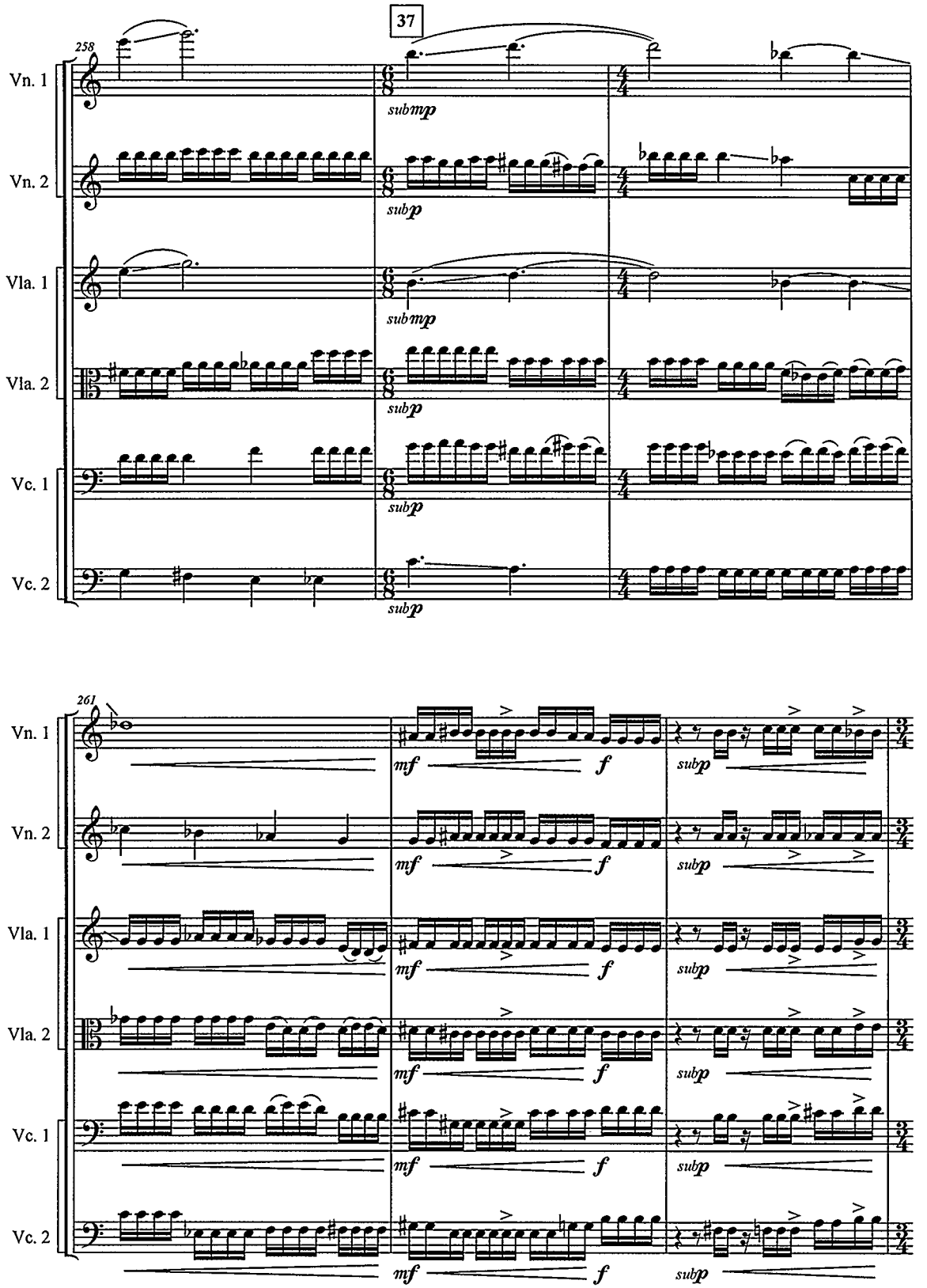

241
pizz
arco
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mp
p
mf
pizz

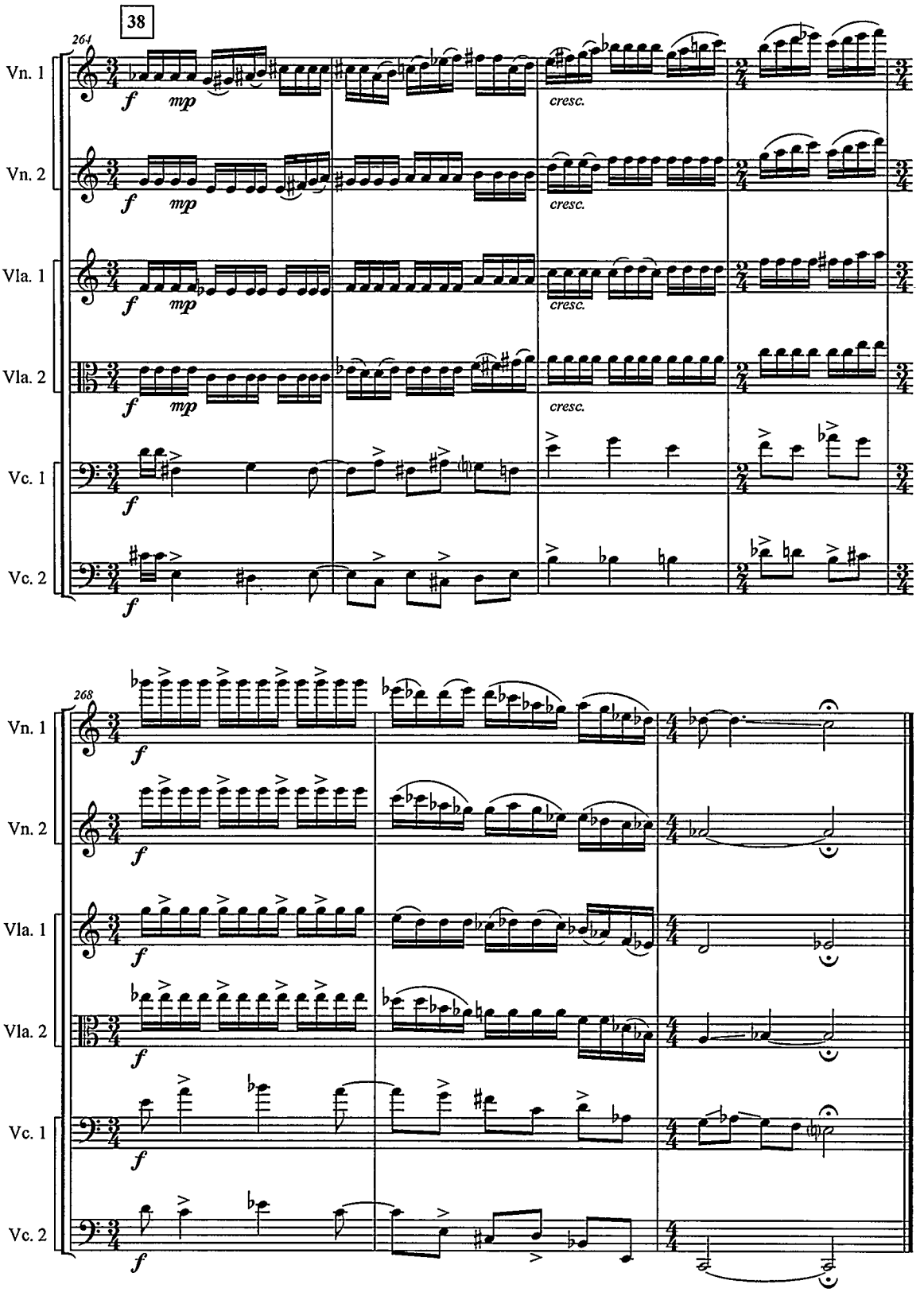

244
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mp
p
pp


246
35
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
cresc.
mf
p
pp
mp
249
36


252
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
mf
mp
p
cresc.


255
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
f
mf
mp


37
258
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
submp
subp
261
mf
f
subp


38
264
Vn. 1
Vn. 2
Vla. 1
Vla. 2
Vc. 1
Vc. 2
f
mp
cresc.
268