Cope

for chamber ensemble and fixed electronics

A thesis

submitted by

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ABSTRACT

Cope (2012-2013) is a composition for a chamber ensemble of eight instrumentalists, a conductor, and stereo fixed electronics. Writing this piece allowed me to experiment with composing for a larger group than I had previously, and served as a vehicle for exploring the fusion of live and electronic sonic textures. Aesthetically, the piece represents a link between my diverse stylistic interests. As the first piece that I have written for an ensemble of this size, it was an incredible learning experience in terms of orchestration, instrumental writing, and the controlling of logistics surrounding the use of a computer with a live ensemble. In this paper, I examine the inception of the work and several elements of the composition that I feel are important to its identity. I discuss composers who have influenced my compositional voice, the compositional processes itself, the musical language I employed, the process of integrating live and electronic sounds, and the potential future life of *Cope* beyond its current instrumentation and form.

ACKNOWLEDGEMENTS

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Cope

INTRODUCTION

The pre-compositional phase of *Cope* provided an opportunity for me to survey, and, ultimately, to try to better understand my musical background. I did not intentionally use *Cope* as a way to comment on my musical influences and experiences, but I did revisit a good deal of my favorite music during the time leading up to the composition of the piece. I am sure that some of these elements found their way into the work.

I studied classical piano when I was a child, after my parents discovered that I was able to play by ear. The music that I played at the piano was the only classical music that I heard in my house while growing up. My parents listened to The Supremes, Stevie Wonder, Carole King, James Taylor, and other popular music artists, and this was the bulk of the music that I heard when I was young. I progressed quickly in piano lessons, and as my skills improved, I started to use material from my assigned piano homework as the sources for new pieces of my own. This was my first experience with composition.

During my early teenage years, I taught myself how to play the guitar. My friends and I listened to rock music and hip-hop, from Pearl Jam and Stone Temple Pilots, to Dr. Dre. We formed bands, wrote songs, and performed at our school's talent shows. The process of writing music was communal—an aspect

that I enjoyed immensely—and performing the songs that we wrote was satisfying. During the early part of high school I discovered jazz, and began taking lessons in jazz piano and improvisation. The process of starting with the basic outline of a song and creating a new, improvised work out of it resonated deeply with me. This experience was the catalyst for my decision to dedicate my professional life to music.

I studied all types of contemporary popular music during my undergraduate years at Berklee College of Music, focusing mostly on jazz and fusion. Much of my current approach to harmony, form, and rhythm was developed during this time. I analyzed compositions and transcribed solos of jazz composers and performers such as Chick Corea, Michael Brecker, Herbie Hancock, and Allan Holdsworth. My current tendency to compose using modes as foundational pitch material, as well as the prevalence of pulse and groove in my music, probably stems from my admiration for these artists and their music. While at Berklee, I also studied music recording and production, sound design, and electronic music composition. These experiences account for the prevalence of electronic elements in the music that I am writing today.

As my musical tastes have evolved, and as I have become a more skilled musician and composer, I have focused on developing my compositional voice into something that is unique. Since I began graduate studies at Tufts, I have actively tried to challenge my own compositional tendencies and improve my craft. I have also attempted to trace some of the influences that specific composers

and ideas have had on particular elements of my writing—for example, pitch, rhythm, texture, and form.

As for the rhythmic aspects of my writing, Conlon Nancarrow, Tom Johnson, David Lang, Steve Reich, and the metal band Meshuggah have been significant inspirations. Their works, especially Nancarrow's *Studies for Player Piano* (1948-1992), Meshuggah's *Chaosphere* (1998), *Nothing* (2002), and *obZen* (2008), and Johnson's text, *Self-Similar Melodies* (1996), introduced me to rhythmic concepts such as temporal dissonance, large-scale polyrhythm, and melodic and rhythmic fractal composition. These discoveries helped me to infuse my music with more interesting and purposeful rhythmic content. Ravel and Debussy, whom I have long admired, have enriched my harmonic writing, as have the works of György Ligeti, Iannis Xenakis, and the jazz and fusion artists that I mentioned above. My interest in popular electronic music stems from artists such as Radiohead, Aphex Twin, Autechre, Squarepusher, and BT. The drum programming and digital editing techniques of Squarepusher and BT have been particularly influential: I integrated glitch editing as prominent sonic texture into the second movement of *Cope*. (This editing technique involves using short fragments of audio clips and other sonic artifacts that are manipulated, repeated, and/or distorted to create rhythmic and textural interest.) Lastly, my studies of Arabic music systems and my experience composing "The Disincorporation of Four Towns" (2011) for the Boston Microtonal Society have opened my ears to the possibilities of pitch selection outside of the twelve-tone equal temperament system.

It is difficult, however, for me to determine the precise degree of influence that these composers, musical concepts, and experiences had on *Cope*, or on my evolving compositional voice. Instead of trying to deconstruct and explain my individual writing style, it may be more accurate for me just to say that I try earnestly to take *something* from everything I hear. I believe that there is probably at least one compelling aspect evident in every piece of music, and, as a composer, I feel that it is my job to find that element, and to try to learn something from it.

MUSICAL LANGUAGE AND THE COMPOSITIONAL PROCESS

In its current form, *Cope* is presented as a two-movement work with an order of movements that is flexible. The most characteristic section of the first movement, "I," (beginning at m. 80) is its focus on using the ensemble as a large, consolidated force, articulating powerful tutti chords that are superimposed over a continuous tremolo in the fixed electronics part. The second movement, "II," leans toward my rock and fusion influences, utilizing a distorted Fender Rhodes electric piano and a percussion battery consisting of a kick drum and various found metal objects. The inclusion of the Fender Rhodes is a nod to the fusion and jazz/rock of the 1970s, but the movement as a whole is not intended to be an imitation of that genre. In a later section of this paper, I will discuss the order, potential interchangeability, and possible future expansion of the piece, but for now it should be noted that the current ordering of the movements is not set; *Cope* in its current form does not necessarily represent a complete and unchangeable work.

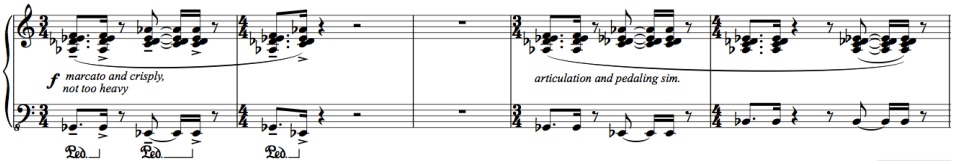
I selected the title of the work from a notebook that I started keeping in 2011. This is a place where I occasionally write down musical ideas, personal thoughts, words, and phrases that inspire me. I do not recall when, over the last two years, I wrote the word "cope" in this notebook, or for what reason, but as the piece began to take shape I felt increasingly drawn to this word as a way to describe how the music was affecting me. The piece itself began to become about

coping: how it feels to have effectively dealt with something difficult, or how listening to this piece may help someone to cope with a loss. It also took the form of an inspirational command: urging the listener to cope. More personally, it could have to do with my own attempt to cope with the struggles that I faced in composing this piece. Admittedly, the reason for selecting this title is somewhat mysterious, and was led entirely by my intuition, but I believe that it is integral to the disposition of the work.

The composition of *Cope* was a non-linear process of trial and error using every type of technology available to me. My primary methods of creating the music were free improvisation, pencil and paper sketching, recording and MIDI sequencing, and digital audio editing. I jumped around between these phases as my needs dictated. To illustrate this process, I will provide overviews of my approaches to composing certain sections from each of the two movements of *Cope*.

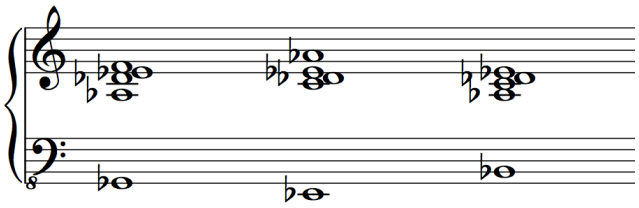
I think of the main themes of "I" (mm. 17-46, developed at mm. 80-146) as a series of chord riffs, which I wrote at the piano after several weeks of improvisation. **EXAMPLE 1** shows the first few measures of this theme. If we isolate

EXAMPLE 1 *Cope*, "I," mm. 17-21, piano part



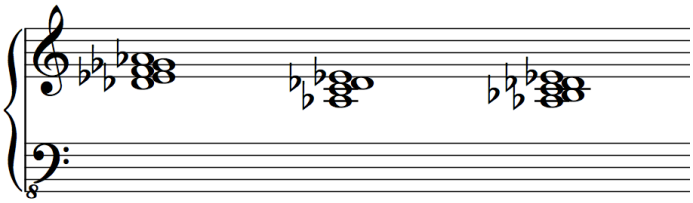
the three distinct chords that comprise the chord riff (EXAMPLE 2), we can see that there are a few different possibilities in characterizing the harmonic content. For instance, we could say that the first chord is basically a G^{b}-major 9 with an added

EXAMPLE 2 *Cope*, "I," mm. 17-21, piano chords



6 and a missing 3rd, the second chord is an A^{b}-major triad in second inversion with an added 11, and the third chord is a B^{b}-minor 7 with an added 9 and 11. While I was writing this movement, however, I viewed each harmonic event as a collection of pitch clusters. EXAMPLE 3 shows these clusters in closed position. By taking each cluster and experimenting with the voicing, I eventually arrived at the chords that I wanted. In jazz terminology, the resulting chords for mm. 17-21

EXAMPLE 3 *Cope*, "I," mm. 17-21, piano chords in cluster voicing



could be labeled D^{b}add2/G^{b}, A^{b}add2/E^{b}, and A^{b}add4/B^{b}. In this case, the pitch name to the right of the diagonal slash indicates the lowest voice, while the chord label on the left side of the slash indicates which chord to play over the bass. I

conceived much of the harmonic material of the first movement in this way, exploring the implications of pitch clusters in a variety of voicings. I did not exclusively use this approach, but it provided a starting point for improvising and sketching.

Moving to the rhythmic elements of "I," the two-against-three (2:3) motive (beginning at m. 17, but present throughout the movement) that serves as a primary feature was conceived over the summer of 2012 while I was studying composition in France. (In this context, "2:3" refers to a rhythmic situation where two rhythmic events of equal duration occur simultaneously in the space of three rhythmic events of equal duration.) At that time, I had sketched some ideas for a piece that used this rhythmic gesture as a main organizational feature. Once I had a sense of the pitch material that I was going to use, completing the main theme of *Cope* was a matter of pouring the newly conceived harmonic material into this basic rhythmic mold.

With the basic pitch and rhythmic material determined, I moved to my digital audio workstation (DAW), Logic Pro, and began improvising. I set up a metronome click track at quarter note = 108 BPM and began MIDI-sequencing several different improvised versions of the piano part against the click, using the 2:3 relationship as the main rhythmic motive, and using the harmonic approach described above. After improvising for a while, I listened back to the recording and digitally edited together a composite of the most interesting moments. It was this composite track that, after some further development, would become the primary theme of "I" (mm. 17-46, and beginning again at the tutti in m. 80).

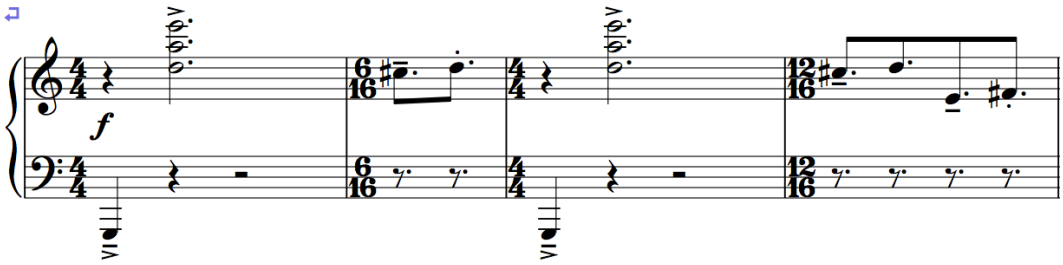
I composed the remainder of the movement by going back and forth between the piano and the computer, writing out some sections by hand, and improvising others. Soon I began to get a sense of the form of the entire movement: the first statement of the main theme articulated by the piano would serve as the A section (mm. 17-48), followed by a respite in the form of an extended viola solo (mm. 49-79), followed by the development of the main theme orchestrated for the full ensemble (mm. 80-146), and ending with new material (mm. 147-190) that could be considered a sort of transition into the next movement. After I completed the sketches, I transcribed to paper the audio portions that had been recorded into Logic, and began engraving in Sibelius.

"II" was composed using many of the same tools and methods, although most of the writing took place at the Fender Rhodes and the computer. I decided early in the pre-compositional phase of *Cope* that "I" would feature the acoustic piano and "II" would feature the Fender Rhodes. (The Fender Rhodes is used sporadically in "I" as a supporting element.) I also knew going into the writing process that, in "II," I wanted to process the Fender Rhodes with distortion.

Through improvisation, I composed the characteristic rhythm of the movement, which gives a feeling of metric shift every other measure or so. **EXAMPLE 4** shows the Fender Rhodes part at mm. 191-194 (the first four measures of "II"). This section begins with a measure of 4/4, where the pulse is clearly on the quarter note. The next bar is a measure of 6/16, which asserts the pulse on the dotted eighth note. The following bar, m. 193, is back to 4/4, with a quarter note pulse, and the final bar of **EXAMPLE 4** is 12/16, which, again, places the pulse on the

dotted eighth note. This focus on the 2:3 rhythmic relationship unifies the two movements of *Cope*, but the divergent instrumental textures, and other contrasting rhythmic features, sufficiently distinguish one from the other.

EXAMPLE 4 *Cope*, "II," mm. 191-194, distorted Fender Rhodes part



As with "I," I composed the A (mm. 191-244) and A' (mm. 322-end) sections of "II" by improvising and recording the Fender Rhodes part, and then editing, developing, orchestrating, and finally transcribing it. I treated the B section (mm. 245-321) as a development section, which more prominently features the fixed electronics. The composition of the B section of "II," particularly with respect to the integration of fixed electronics, will be described in more detail in the next section.

FUSING LIVE AND ELECTRONIC SOUNDS

My past experience with amplified and electronic music significantly shaped the way that I composed *Cope*. From the outset of the process, I made it a primary goal to integrate live sounds with electronic and electronically altered materials, although, initially, I did not know what I wanted the final outcome to sound like. As the piece evolved, after experimenting with different possibilities, I decided to combine pre-recorded or sampled acoustic instrument sounds, synthesized electronic sounds, and some live distortion on the Fender Rhodes to constitute the sound world. The fixed electronics became a means to extend the ensemble. Overall, though, I wanted the gestalt to be cohesive; I did not want to unnecessarily draw attention to the electronic elements, but rather, have them coexist with the live ensemble. The homogeneity of the sound world was a primary concern of *Cope*, and there are two areas that I believe achieved this goal particularly well.

The first area is the glitch editing in the string trio section in "II" (mm. 292-321). Beginning abruptly at m. 292, the bass clarinet and percussion drop out, and the string trio, with support from the distorted Fender Rhodes and fixed electronics, comes to the fore. There are three electronically generated elements featured here. The first is a synthesized bell-like sound that is primarily marking the downbeats of each measure. Dynamically, it is submerged. This sound is actually a composite of two synthesized sounds, from the software synthesizers

Reaktor and Absynth (both by Native Instruments). The second electronically generated element is the glitch editing of the string parts, which is essentially a distorted mimicking of the material that the trio is playing. It is intended to bring to mind the image of one's reflection from a broken mirror. A well-balanced dynamic mix between the electronically generated and live sounds is crucial to ensuring that this new sound does not jut too far out of the texture. This section underscores the importance of having a skilled mixing engineer controlling the sound reinforcement in the hall during performance or recording.

The glitch editing was achieved in the following way. First, I MIDI-sequenced the individual violin, viola, and cello parts from the string trio section (mm. 292-321) using samples from the *Vienna Symphonic Library Horizon Series, Opus 2* (Vienna Symphonic Library GmbH) as the sound sources. This sample library is widely regarded as one of the most accurate in the industry for orchestral instruments. Each sample instrument is built from the recordings of individual pitches that are performed on real instruments. Each pitch is recorded at multiple velocity levels, and with many different articulations. This yields a highly realistic sound, and produces virtual orchestral instruments that are performable with a MIDI keyboard controller. Next, I ran each string part twice through the software plugin *Livecut*, by Smartelectronix. This plugin produces time-based distortion, beat slicing, and other "glitch" effects. Each time I ran a string sound through the plugin, I changed the parameters of *Livecut* so it produced a slightly different glitch pattern. I produced two affected versions of each instrument—violin, viola, and cello—creating a total of six layers of glitched

sounds. I then panned each of the six layers to different places in the stereo image, and adjusted the volumes of each so that some were more prominent than others. When the piece is performed, the intended effect is that, after the live string section articulates chords, they are echoed by digitized and distorted—glitched—versions of themselves.

The second area that illustrates a successful extension of the sound world through the integration of electronically altered sounds is the processing of the Fender Rhodes with distortion in "II." Starting on the downbeat of m. 191 (the beginning of "II"), the Fender Rhodes, which is unprocessed throughout "I," is processed with overdrive distortion. I chose to distort the Fender Rhodes for a few reasons. The sound of distortion is prominent in the sonic texture, and sharply distinguishes the movements. It is a rough-hewn sound that takes up a significant amount of space in the frequency spectrum. It has the effect of making the ensemble sound larger than it really is. Due to the complex timbre of the distorted Fender Rhodes, it combines in interesting ways with the other instruments in the ensemble. For example, at mm. 227-232 and 357-379, the soli between the Fender Rhodes and the cello create a composite sound that blends to such an extent that it is difficult to tell one instrument apart from the other.

This distortion effect can be achieved in a number of ways, depending on the preference of the ensemble. In the first readings of the piece, I routed the output of the Fender Rhodes into the computer, processed it using a simple overdrive distortion plugin in Logic, and diffused it into the hall. As an alternative

to processing the signal with the computer, the signal could be processed using an overdrive pedal controlled by the pianist.

DIFFUSION, SYNCHRONIZATION, NOTATION, AND MIXING

The fixed electronics in *Cope* are diffused into the hall using two speakers that are set up stage left and stage right. The exact position of the speakers is dependent on the specific performance situation. If there is no amplification of the live instruments (based on the preference of the ensemble), the speakers can be located downstage, which will allow them to act as both a public address system (for the audience to hear) and a monitoring system (for the musicians to hear). If amplification is required, however, the speakers should be positioned upstage to avoid feedback, and separate monitor speakers should be used to allow the musicians to hear the computer's output.

As "I" begins, the conductor hears the synchronization track in his or her headphones. This track consists of the combination of a metronome and pre-recorded verbal cues, and the person running the computer triggers it offstage. Four quarter-notes are heard in the conductor's headphones to allow him or her to conduct the anacrusis in time with the backing track, and to cue the entrance of the xylophone on the downbeat of m. 1. The metronome track embedded in the synchronization track consists of two tones: the first is a higher pitched percussion sound, which marks the downbeats of every measure, and the second is a lower-pitched percussion sound which marks the other beats in a measure. The synchronization track also includes pre-recorded verbal cues to signal the rehearsal marks. This is intended to assist the conductor in cueing sectional

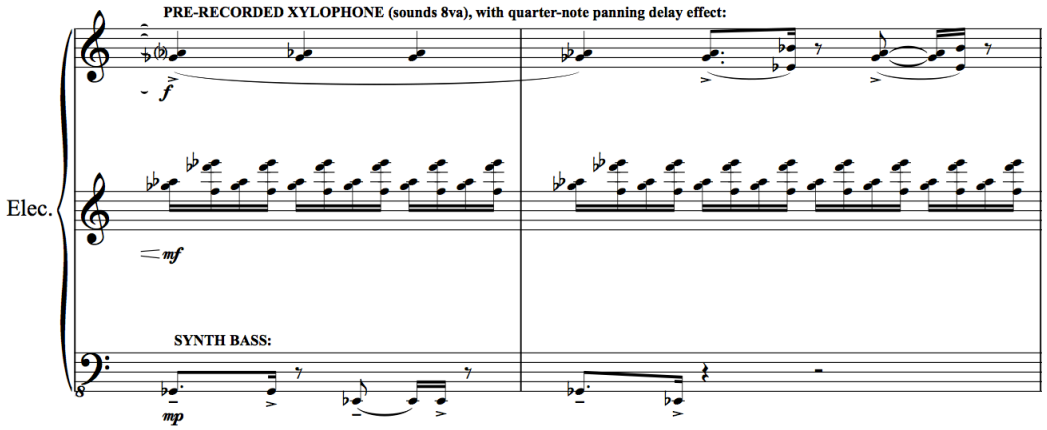
changes. Before, and on, each rehearsal mark, the conductor hears a voice in the headphones counting, "…one, two, three, four, 'B'." Since this synchronization track is sent to the conductor's headphones, it is only audible to him or her and not to the musicians or the audience.

After the initial reading and recording sessions, it became apparent to me that the percussionist may have also benefitted from hearing the synchronization track through an additional set of headphones. Since the role of the percussionist in *Cope* is more or less as a drummer, that is, as a timekeeper for the ensemble, hearing the metronome track may have helped him to play more steadily with the backing track, therefore providing a more stable rhythmic foundation for the rest of the ensemble. It also occurred to me that, with a headphone splitter and enough headphones, the piece could conceivably be performed without a conductor. This perhaps would not be ideal, as the ensemble would not be able to balance dynamically with each other as effectively (the headphones obviously hinder the ability to hear what is going on in the hall), but if the piece were to be performed amplified by an self-conducted ensemble using a mixing engineer to carefully control the dynamic balance between instruments, it could be a viable alternative.

I felt that it was necessary to notate, in some form, the fixed electronics in the score. Since much of the electronics part involves the layering of additional virtual instruments into the ensemble texture, I decided that it would be appropriate to notate it as if it were a collection of actual instruments being performed by additional live musicians. In the score, different sounds and instruments are split between multiple staves, braced under the heading

"Electronics," abbreviated "Elec." (**EXAMPLE 5**). This notation serves two purposes. It allows the conductor to see what is going on in sections where it is necessary to cue musicians and to stay synchronized with the electronics. (This is not vital,

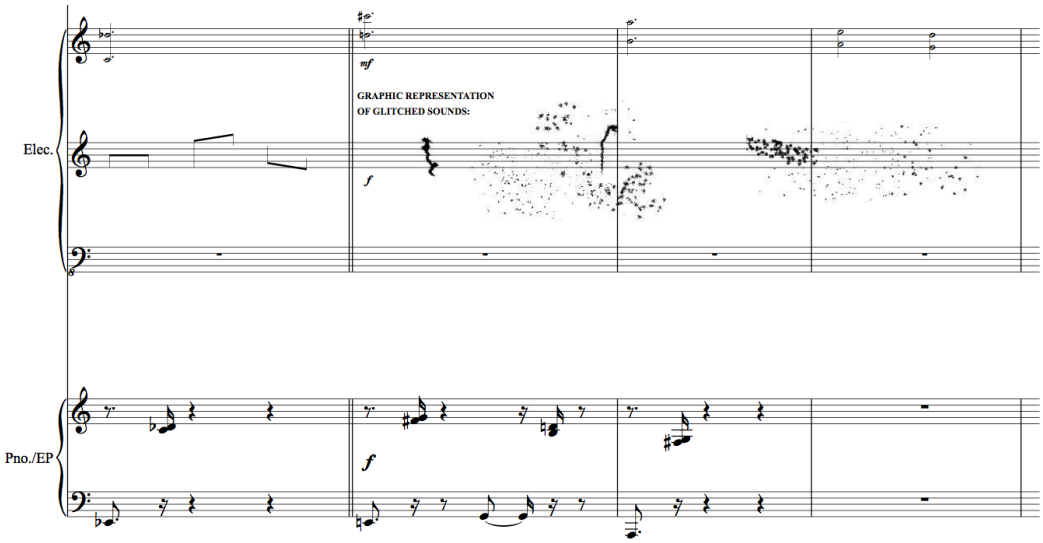
EXAMPLE 5 *Cope*, "I," mm. 80-81, fixed electronics part



however, because the synchronization track that the conductor hears in the headphones does the job of keeping him or her in the right spot in the score.) The more important reason for notating the electronic parts in the score, from my perspective, is that it may allow for a performance in the future where musicians could be added to the ensemble to perform the fixed electronics parts live, either on acoustic instruments or synthesizers. Taking this idea a step further, *Cope* could conceivably be adapted for *fewer* performers by simply pre-recording any desired number of the instrumental tracks that were originally intended for live players, and adding them to the fixed electronics. I will discuss proposals for the future life of the piece in the next section.

A problem that I ran into with this type of literal notation for the electronics was what to do with the glitched passage in "II" (mm. 292-321). The resulting rhythms would have been complex to transcribe, and would have been unhelpful in further aiding synchronization. Ultimately, I decided to use abstract graphic notation, shown below. This type of notation provided the conductor with enough basic information to understand, sonically, what the fixed electronics were doing.

EXAMPLE 6 *Cope*, "II," mm. 291-294, graphic representation of fixed electronics (glitched sounds) in score; piano part included to show approximate rhythmic relationship between ensemble and electronics



CONCLUSION: REFLECTIONS, AND THE FUTURE OF *COPE*

Reflecting on the piece, I identified several areas that are particularly successful in conveying my artistic intentions. In "II," the predominant character is one of intensity, emphasizing forward motion. I have tried to capture this type of energy in previous compositions, but I feel that I was finally able to achieve it with this movement. I also believe that, overall, the fusion of electronic and acoustic textures is quite effective, as was the choice to use a distorted Fender Rhodes as the backbone of "II." "I" also has its high points: the extended viola solo is an unexpected formal element (mm. 49-79) that I think works well; the emergence of the tutti beginning at m. 80 is visceral and exciting. In the end, *Cope* has strengthened my resolve to continue writing music that is direct, forceful, and rhythmically vital, but it has also created a desire to write gentler, subtler works. Additionally, I am now more comfortable writing for larger ensembles, and I feel prepared to tackle more ambitious works.

From a critical standpoint, there are some elements that could have been better. The instrumental writing, as a whole, is slightly underdeveloped. The piece may have benefited from more adventurous sonic textures and instrumental techniques at certain points, as well as a more gritty harmonic language. In view, retrospectively, of the virtuosity of the players in *Sound Icon*, I could have integrated more intellectually and physically demanding elements. My reticence was due, in part, to some apprehension about working with a larger group.

Mostly, though, I think it had to do with the fact that the ideas I chose to use in *Cope* were simply the ones that won out in my creative process. During the time that I was composing the work, I kept returning to a few basic ideas (which ended up in the piece), and I was simply not inclined to write anything else. The piece was formed through a sort of controlled intuition, and the result was this music. I think, however, that there is room for a bit more self-intervention in my creative process, and with *Cope*, I could have stretched myself further, especially with the live players.

Cope, as it stands today, is in a state of flux. During the evolution of the work, I realized that it was shaping up to be more of a flexible arrangement of two pieces for chamber ensemble, rather than a more traditional multi-movement composition with a fixed progression of movements. The two movements are interchangeable if both are programmed on a single concert, but also can stand on their own as complete, separate pieces. This flexibility was not an intentional aim of the piece from the outset, but I embraced it as the form started to come into focus. I find this formal mobility intriguing: the movements could be programmed in sequence ("I" followed by "II," or vice versa), separately (just one movement), or apart from one other on the same concert. An explanation of this flexibility is included in the notes at the beginning of the score to inform the conductor and ensemble of these programming possibilities.

Having distanced myself from the writing process, which I completed in February of 2013, I can now see other possible alternative manifestations of the piece. To expand the large-scale form, I have been considering writing an

additional slow movement, which would provide some connective tissue between the two fast movements. This could impart a more distinctive formal contour to the work, but it may also prompt me to set the order, which would give it a more conventional three-movement shape (fast, slow, faster). I have also considered re-orchestrating the piece for smaller, amplified forces. Conceivably, with only a small amount of rearranging, the piece could be performed with synthesizers, an electric bass, and a mixed quartet or quintet, or maybe an even smaller group. As long as the ensemble is amplified in this scenario, it will be just as powerful as the current instrumentation. This would help to increase the feasibility of performance, as the current ensemble size could make future performances more logistically prohibitive.

I could go in the other direction, instrumentally, by increasing the size of the ensemble. With the addition of a second percussionist, a second pianist playing the Fender Rhodes and doubling on synthesizer (manually triggering some fixed electronics samples), and some modest rearranging, the piece could be performed without the need for a synchronized fixed electronics part, and thus, without the need for a click track. This would free the conductor to take more liberties with the tempo and add more dynamic and temporal variety to the work. There are many possibilities for future versions of the piece. I will need to live with it for a while longer to decide whether or not I want to revise it, let it remain in its current form, or even strip it for parts, so to speak.

Writing *Cope* also brought forth several questions surrounding the role of electronics in a work: Should the person who is running the computer be

considered a performer in the ensemble? Where should he or she be located during the performance? Is it reasonable to ask this person also to handle the mixing duties, i.e., balancing the volume level of the electronics in the hall? Can I trust someone (who is not me) to adequately mix the performance? Is a subtitle necessary for this work, and, if so, what is the best description for the instrumentation? Is "for chamber ensemble" not specific enough? I have developed opinions about some of these questions (see below), but others remain unresolved. I expect that as I continue to work with diverse instrumental forces, including electronic elements, my positions on these questions will evolve.

As for logistical and technical issues surrounding the execution of works with electronics, I have addressed these in other pieces by being present during performances and recordings. This allows me to control many of the variables, but it is obviously not a feasible situation in the long term. The portability of a piece is a concern for me; I want to be able to have numerous performances of my pieces (including works with electronics), but I cannot be expected to attend all of my performances throughout my career. Probably the best approach, for me, is to make these logistical elements as simple as possible (even compromising slightly on artistic ideas, if necessary), and to provide enough written and graphic instruction in the score for someone to be able to realize the work without my intervention. Also, by working with relatively simple elements such as digital audio files that can be played back in any DAW, and by using standard tools such as mixing consoles, audio interfaces, and effects pedals, I can mitigate problems

surrounding technological obsolescence that can become challenging with more extensive electronics setups.

Artistic issues surrounding the role of the person running the electronics did not turn out to be core problems in this piece. Since the primary responsibilities of the person running the computer for *Cope* is starting the sequence and adjusting volume levels on the fly, I decided that it made the most sense for him or her to be situated in the audience, or alternatively, in a sound booth. I felt that it would have been odd to have that person on stage, just sitting there. Also, it is necessary to have them in a position in the hall where they can make judgments about the sound quality, and adjust audio levels, if necessary. The best place to do this is from the audience. There does seem to be a tipping point of physical activity, where it would make sense for someone performing on a computer to be located on stage, alongside live performers (live-triggering loops, twisting knobs, etc.), but this piece does not approach that level of involvement.

Lastly, questions about labeling a work "for fixed electronics," "for laptop," or "for chamber ensemble" need to be dealt with, for me, on a piece-by-piece basis. I am not particularly concerned with signaling to an audience through the title of a work that there is an electronic element involved. In general, as music technology becomes ubiquitous, it often seems irrelevant to distinguish one sound-making device from another. (A violin and a computer are equally capable of producing sound.) But subtitling a work according to its precise instrumental components can allow an ensemble, conductor, or other composer to better

understand the nature of the piece. With Cope, I feel that the subtitle, "for chamber ensemble and fixed electronics," is a helpful descriptor for the purposes of this thesis. If I decide to develop the piece further, however, I will likely remove the subtitle and let the main title stand on its own.

Cope is the most ambitious composition that I have written so far. It is an attempt to unify elements from some of the many musical styles with which I identify as a musician and composer, and it represents an aesthetic direction that I plan to pursue over the next several years. The piece has laid the foundation for composing longer, more substantial works for larger ensembles. I feel prepared to take the lessons that I have learned from this work and apply them toward writing music that is even more unique, and profoundly personal.

Cope

for chamber ensemble and fixed electronics

full score in C

Written for Sound Icon
Jeffrey Means, conductor

Michael Laurello

ENSEMBLE

Flute

Bass Clarinet in Bb

Horn

Violin

Viola

Cello

Piano (doubling Fender Rhodes electric piano)

Percussion (see note below)

- Xylophone, sounds 1 octave higher than notated
- Marimba, sounds as notated
- Riveted (sizzle) cymbal
- Metal gasoline can (medium)
- Metal oil can (medium)
- Kick drum

Conductor

Percussion Battery Notation: 5-line percussion staff, beginning at Rehearsal Mark "N"

- One ledger line above staff: riveted (sizzle) cymbal, designated with an "x" notehead
- Line 5 (top line): handle of metal gasoline can
- Line 4: top of gasoline can
- Line 3: top of metal oil can
- Line 2: side of oil can
- Line 1: kick drum

Note about the Percussion Battery: A variety of found objects of different materials can be used. If deviating from the specific metal canisters listed here, the substitute objects should not have a definite—that is, easily distinguishable—fundamental pitch. However, the timbre of each sound should be distinct, should primarily occupy the mid/high end of the frequency spectrum, and should have a crisp transient. Think of the percussion battery as a "junk" drum kit.

Note about the Fender Rhodes: Whenever possible, a real Fender Rhodes should be used. When that is not available, it is acceptable to use a synthesized or sampled Fender Rhodes sound. The Fender Rhodes signal should be processed with heavy overdrive distortion. Pitch should still be distinguishable, but the distortion should be very fuzzy. It is up to the ensemble whether to process the Fender Rhodes with the computer, or to use a distortion pedal. If a pedal is used, the signal should first go to the monitor/amp, then to the audio interface, then to the house speakers.

Duration: 12'

ORDER OF MOVEMENTS

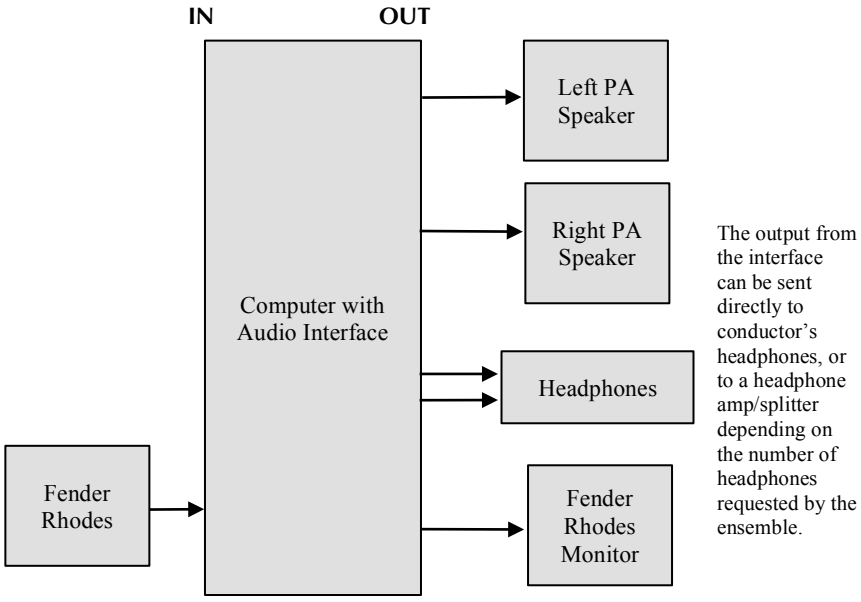
The order of the movements in *Cope* is not fixed. The work should be thought of as a flexible arrangement of two pieces for chamber ensemble rather than a more traditional multi-movement composition with a predetermined progression of movements. The two movements are interchangeable if both are programmed on a single concert, but also can stand on their own as complete, separate pieces. For instance, the movements could be programmed in sequence ("I" followed by "II," or vice versa), separately (just one movement), or apart from one other on the same concert.

ELECTRONIC EQUIPMENT AND SIGNAL FLOW

Equipment Needed

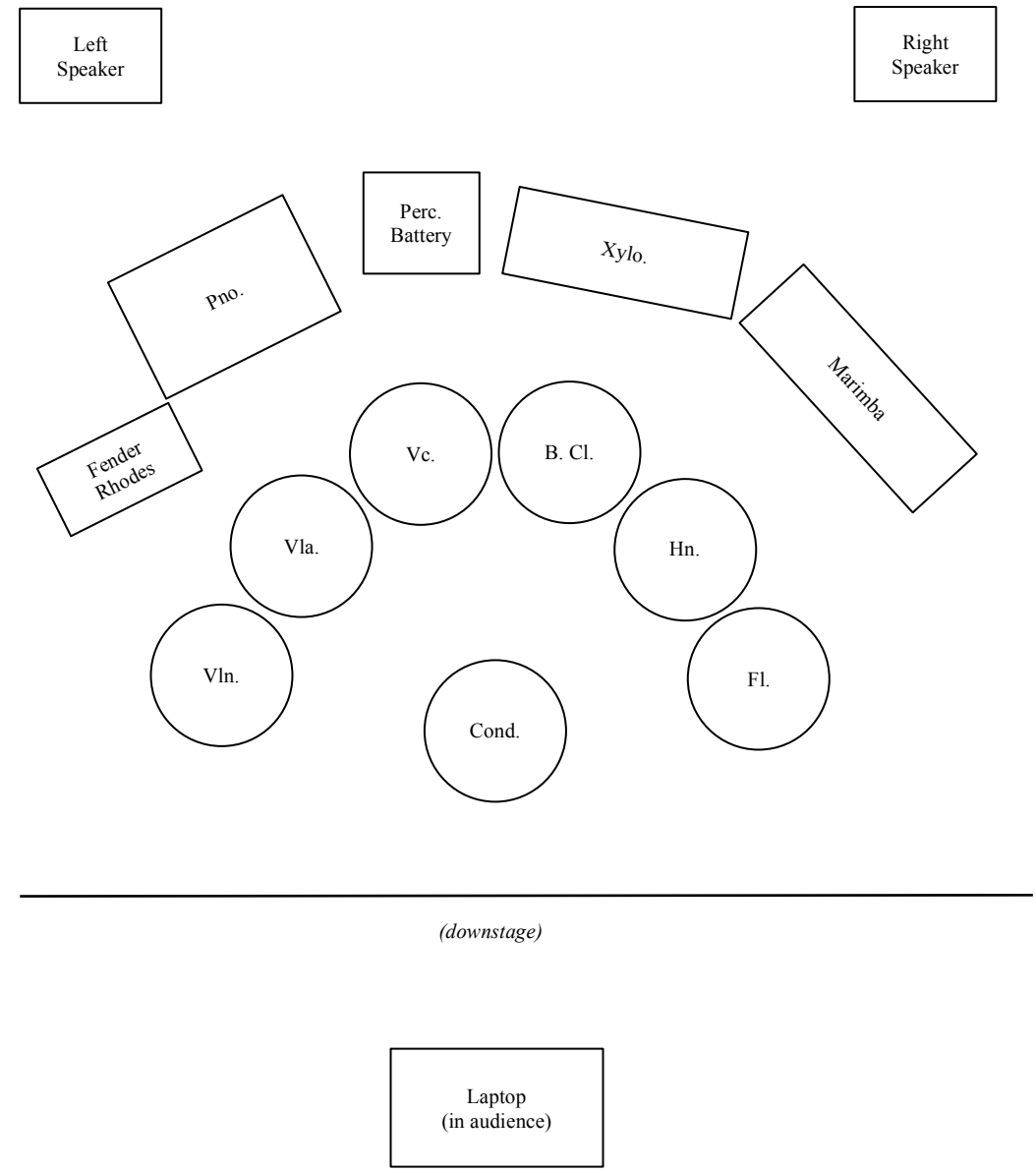
- Computer running DAW software (Logic, Pro Tools, etc.)
- Audio interface (with at least 5 mono outputs)
- Digital audio files for playback from computer (contact composer for these)
- Two full-range speakers, preferably with subwoofers
- Monitor speaker for the Fender Rhodes
- Headphones. The exact number is dependent on the preference of the ensemble. The conductor alone may prefer to wear headphones. In other instances, it may be beneficial for the percussionist to also wear headphones. In situations where the ensemble is self-conducted, several headphones may be required.
- If amplifying the ensemble, microphones (and possibly monitors) for the ensemble will be required. In this case, a separate mixing console to handle the live mix would also be beneficial.
- Cables and connectors

Signal Flow



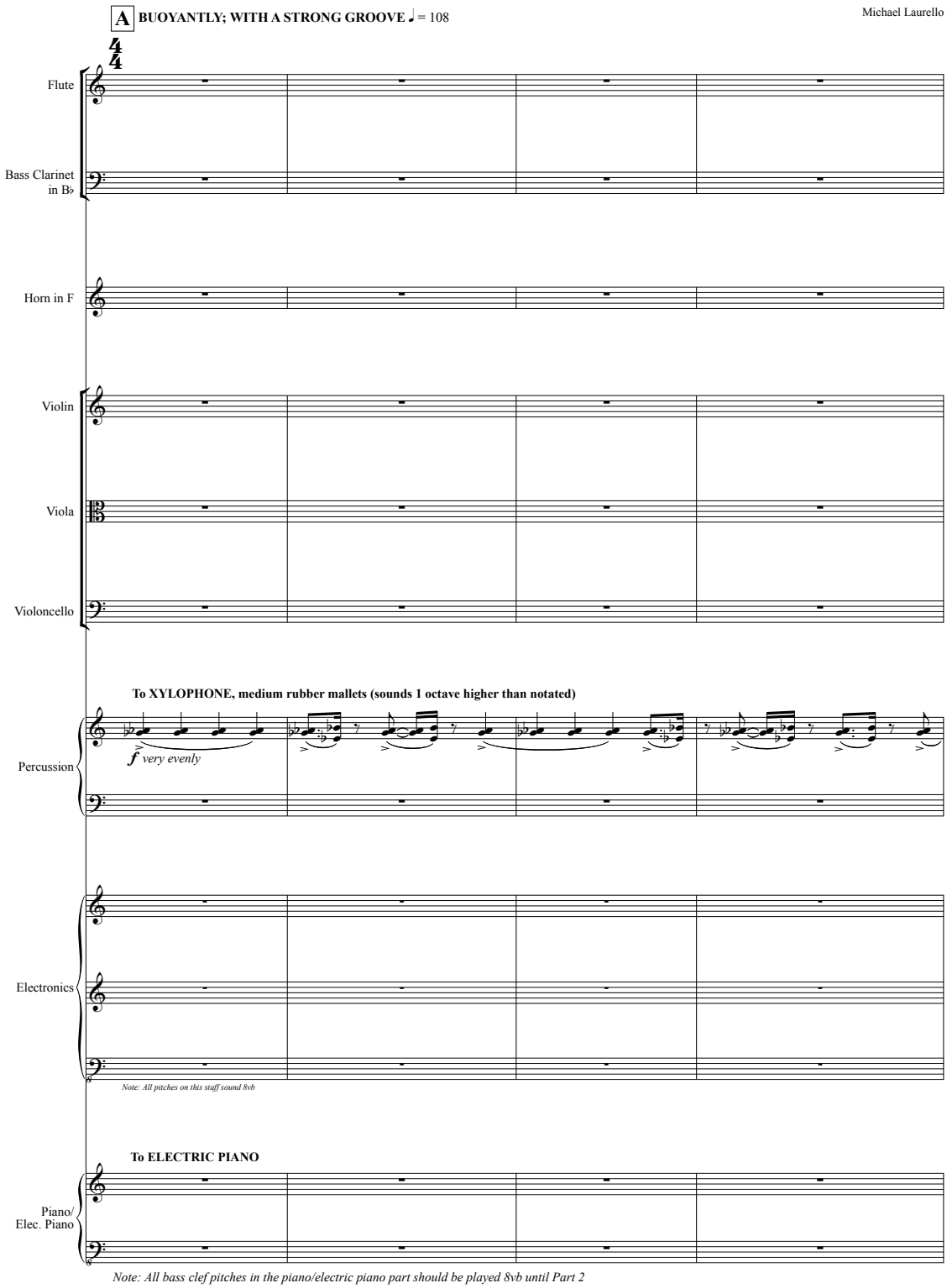
If using the computer to process the distortion for the Fender Rhodes, the output should be sent to the audio interface, where it will be processed with overdrive distortion and sent back out to the Fender Rhodes monitor on stage. The processed signal should also be sent to the house PA speakers, and panned toward the stage position of the Fender Rhodes. Alternatively, if a distortion pedal is used, the Fender Rhodes does not need to be sent through the computer first for processing.

APPROXIMATE STAGE ARRANGEMENT



Cope

I.



Note: All bass clef pitches in the piano/electric piano part should be played 8vb until Part 2

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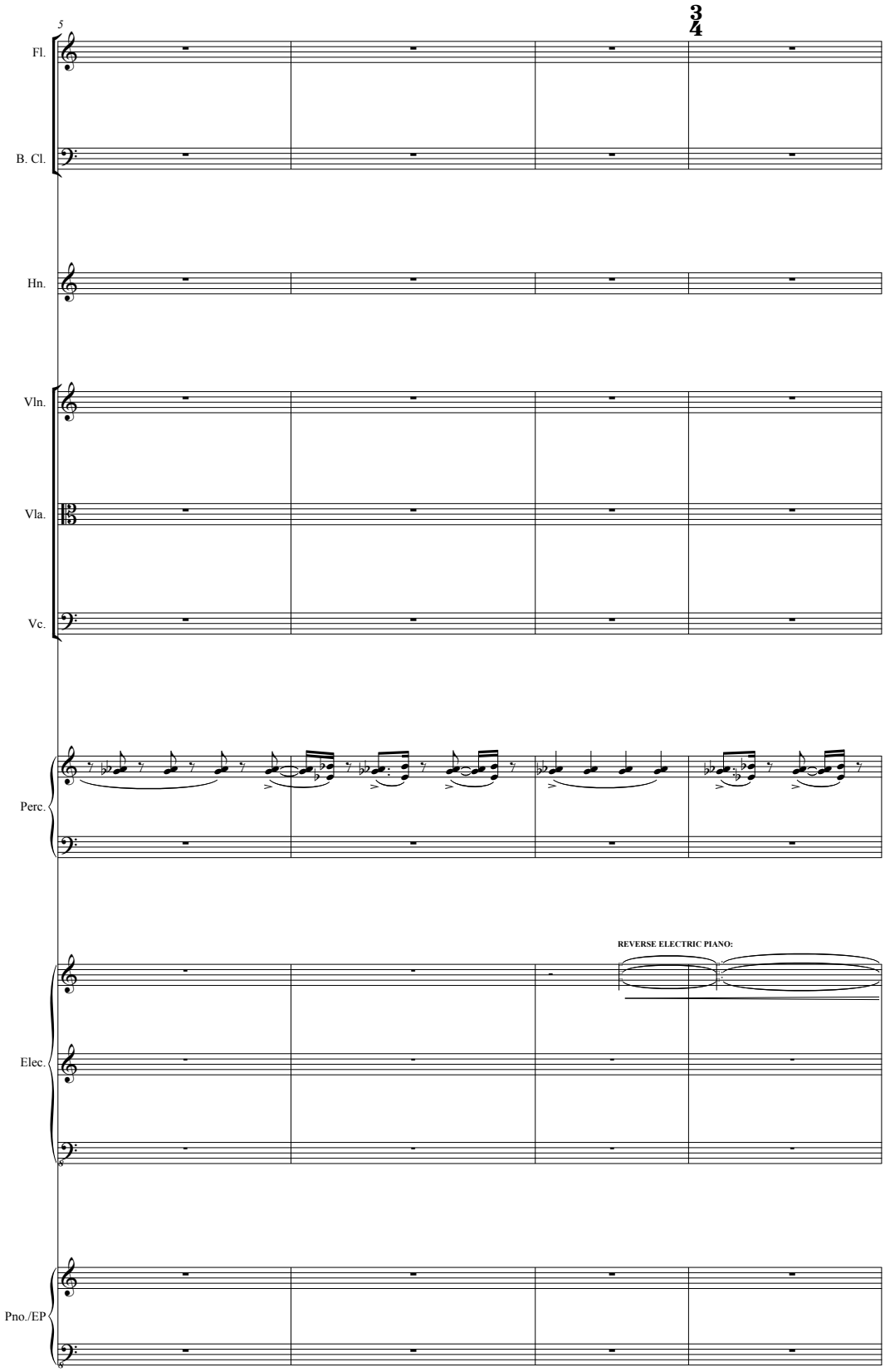
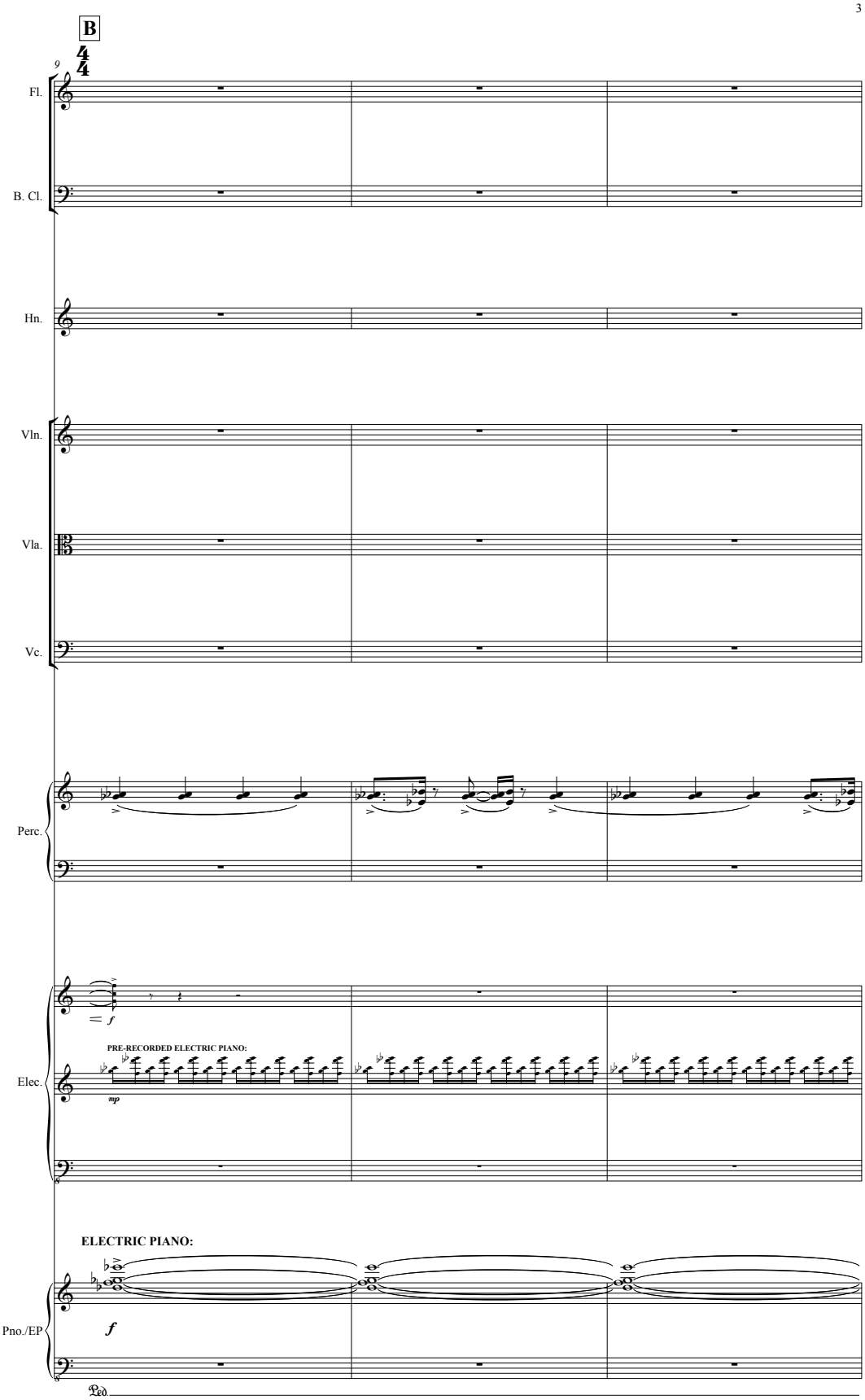
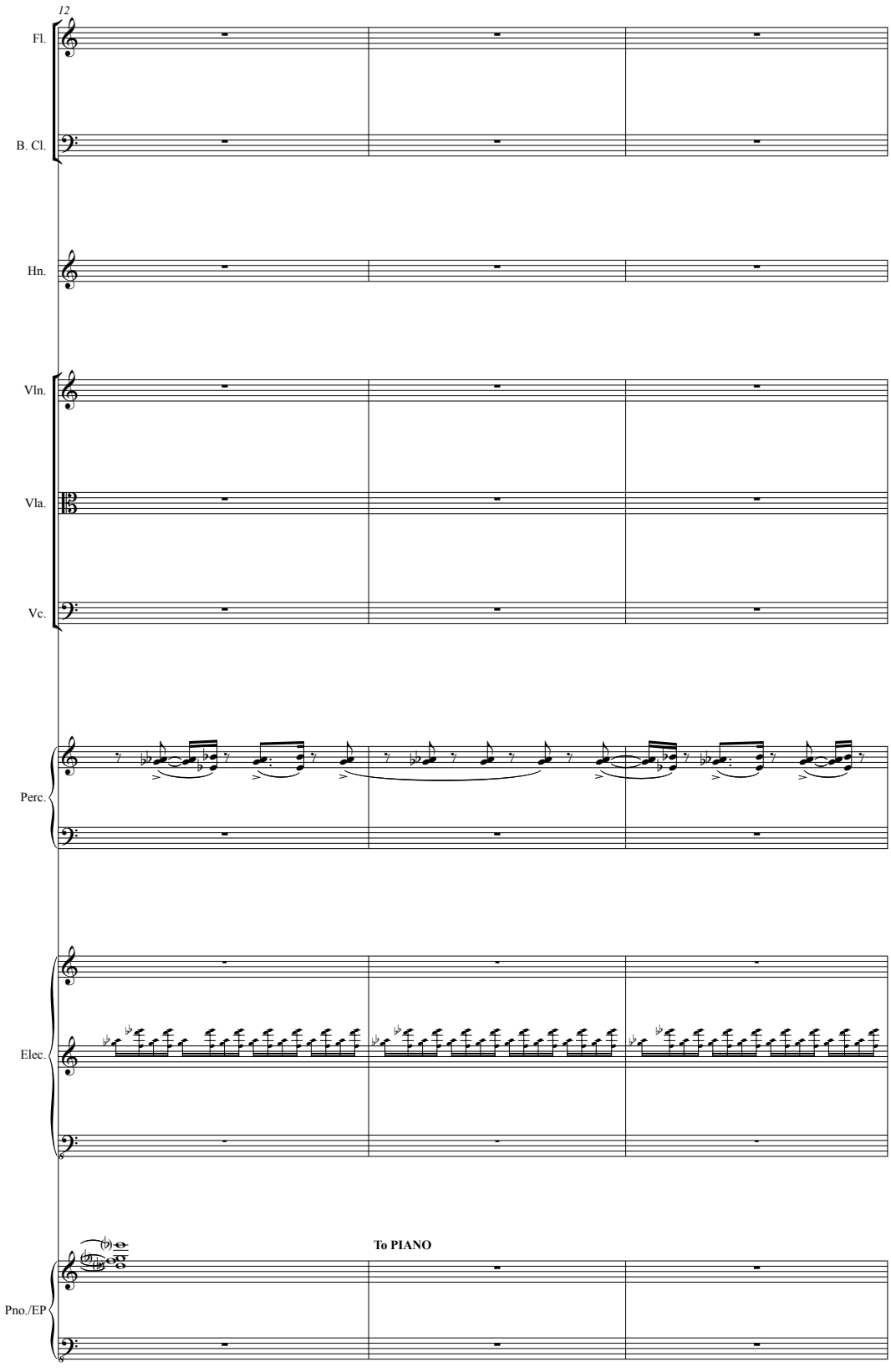
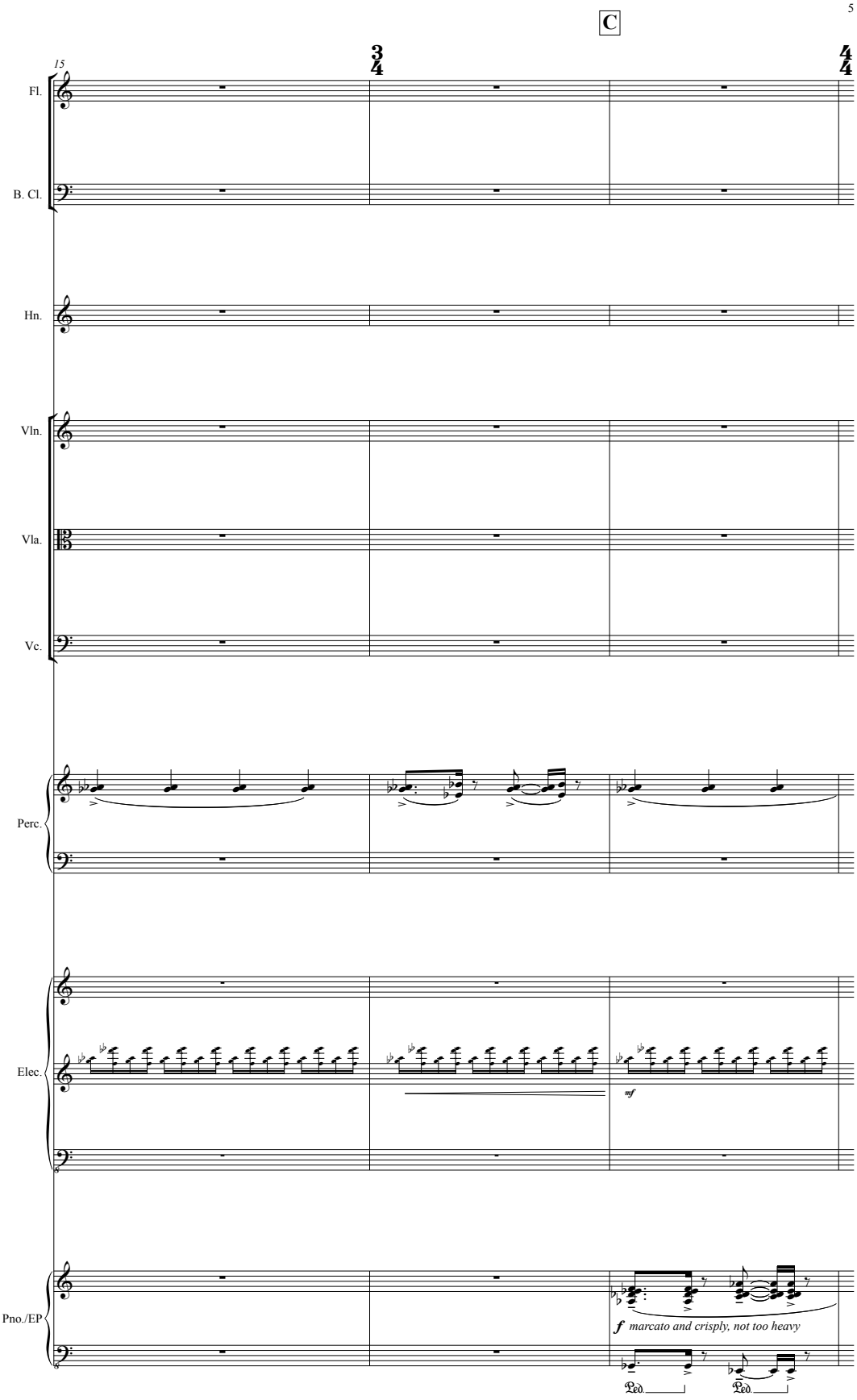
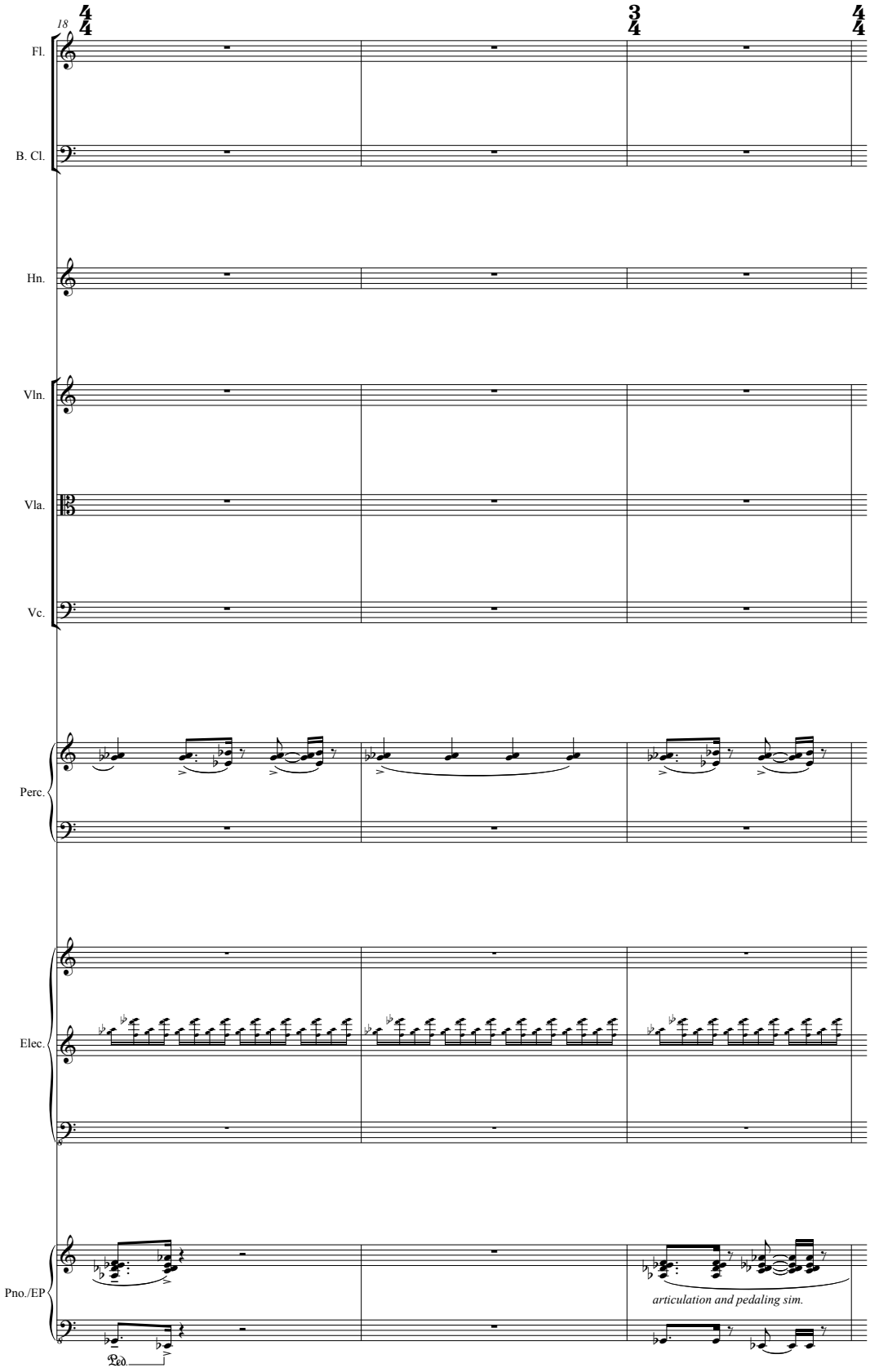
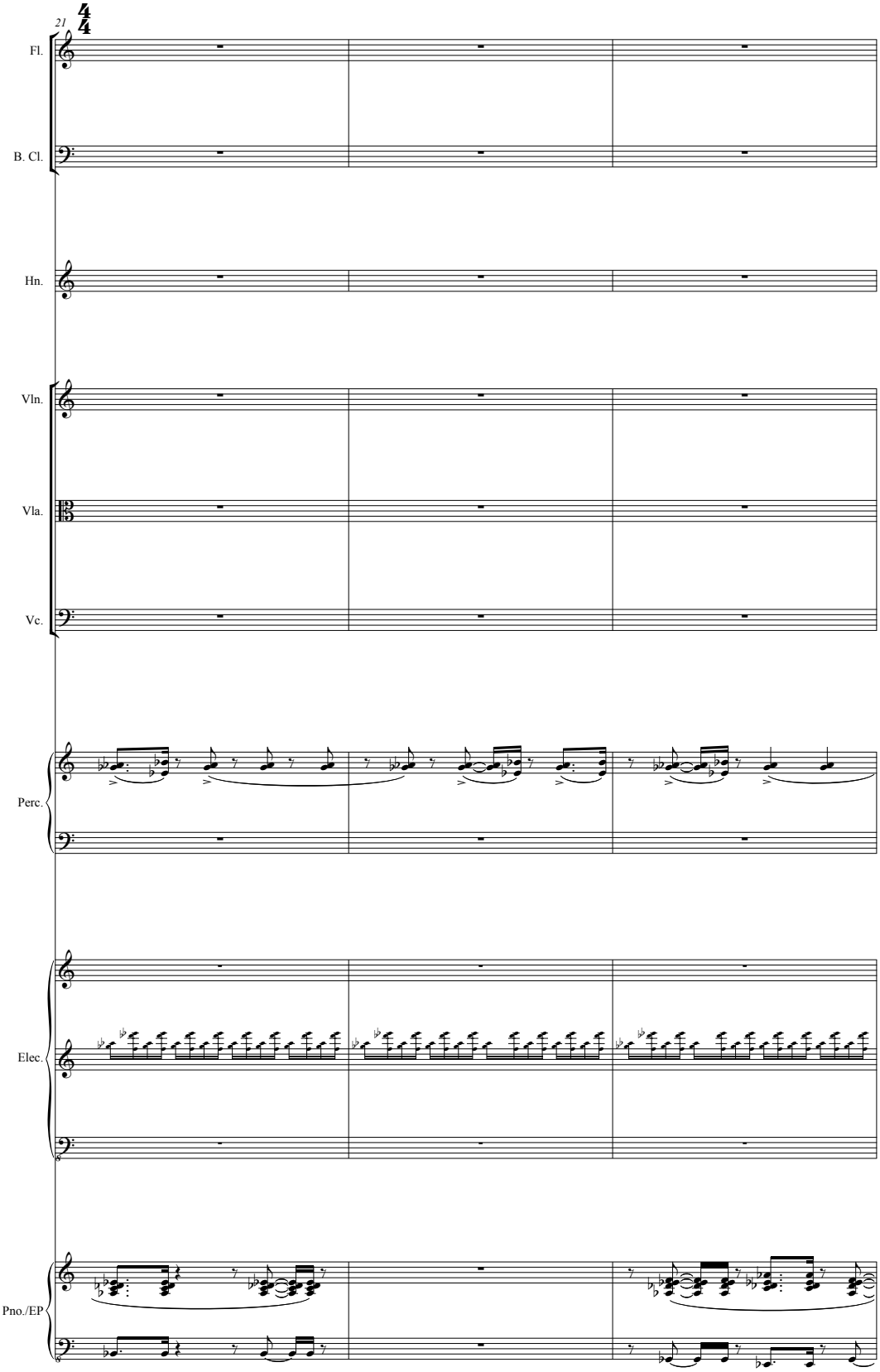

5
3
4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
REVERSE ELECTRIC PIANO:
Elec.
Pno./EP

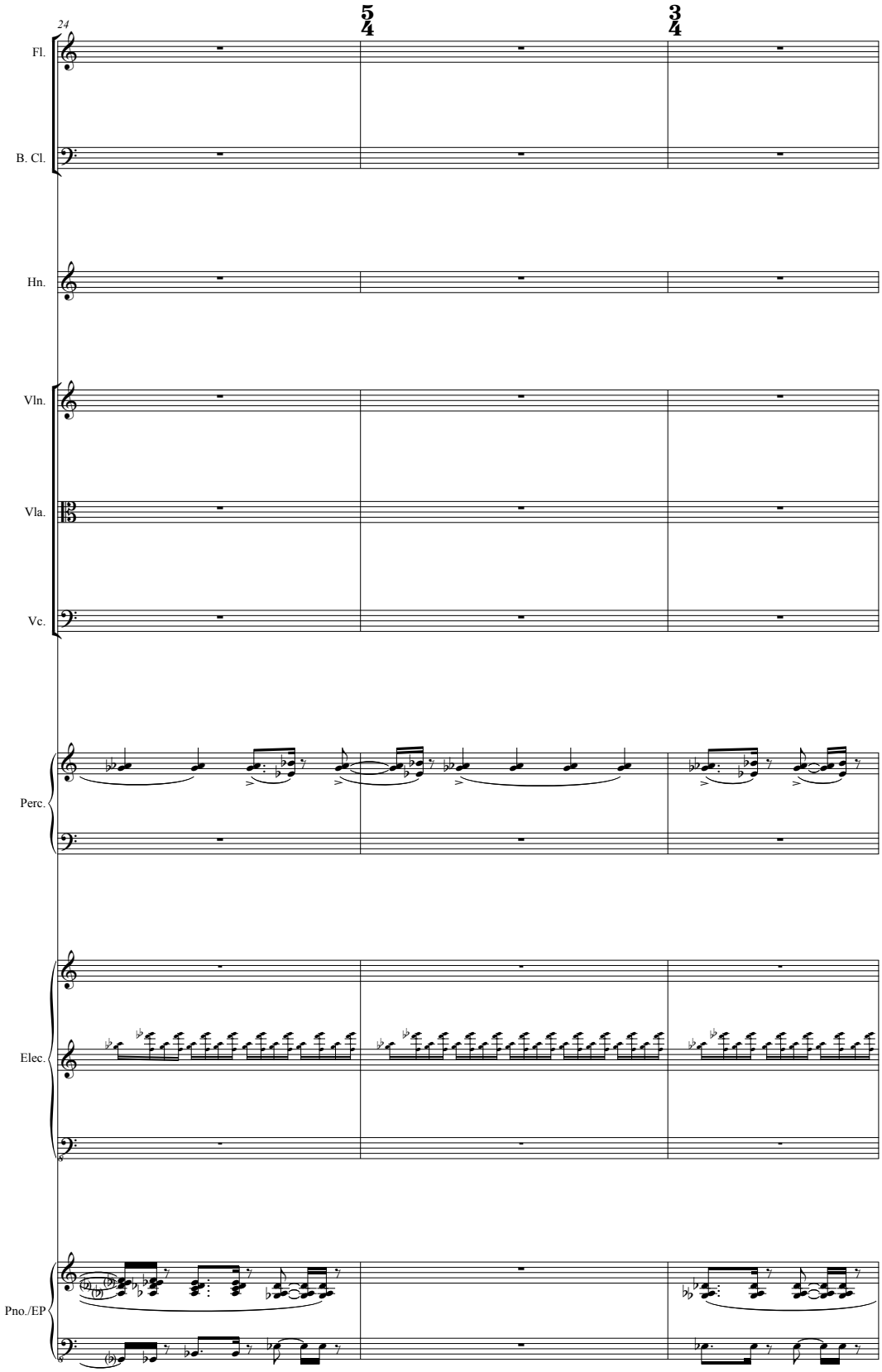

B
9
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
PRE-RECORDED ELECTRIC PIANO:
mp
ELECTRIC PIANO:
Pno./EP
f
Ped.

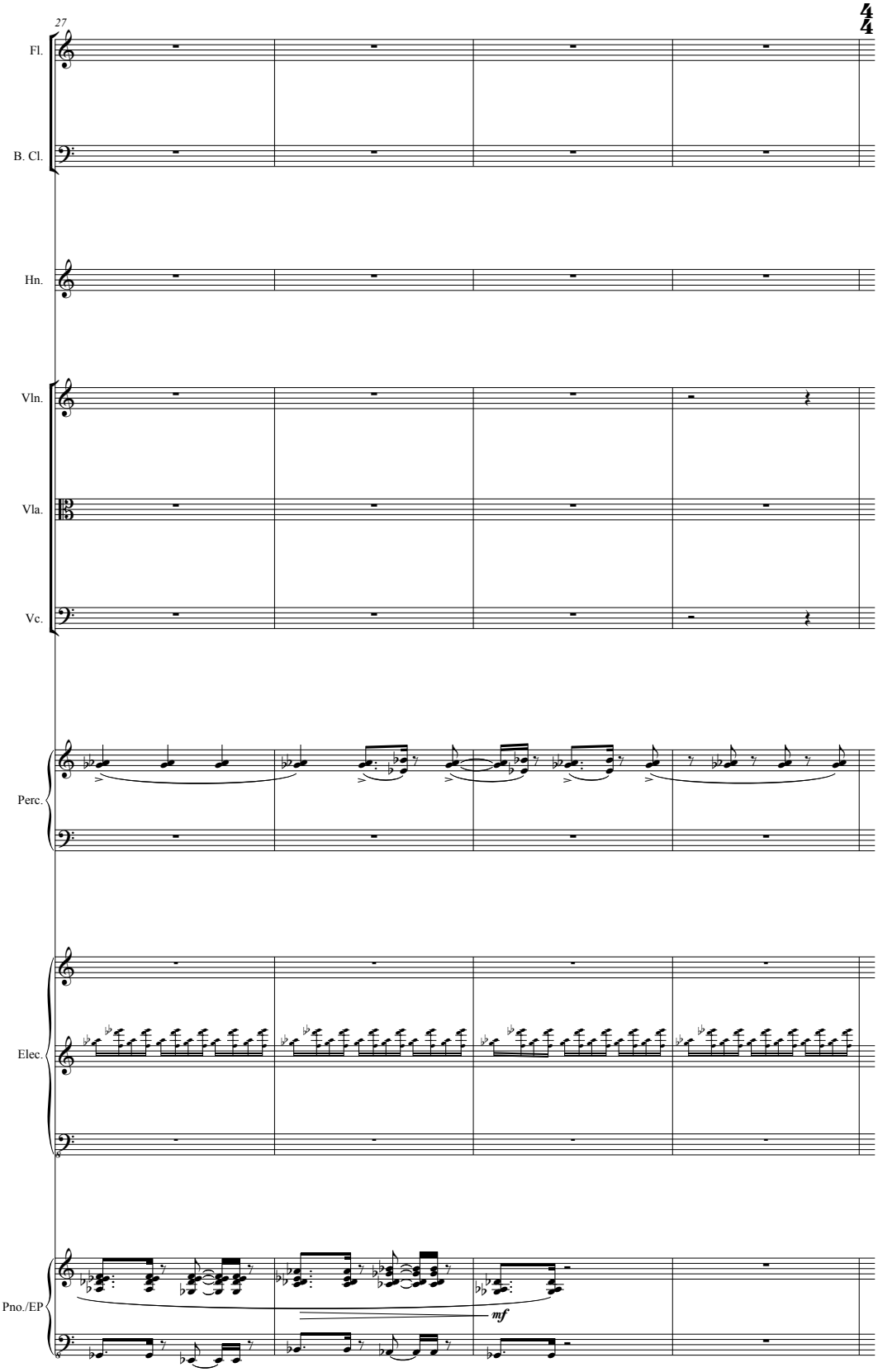

12
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
To PIANO
Pno./EP

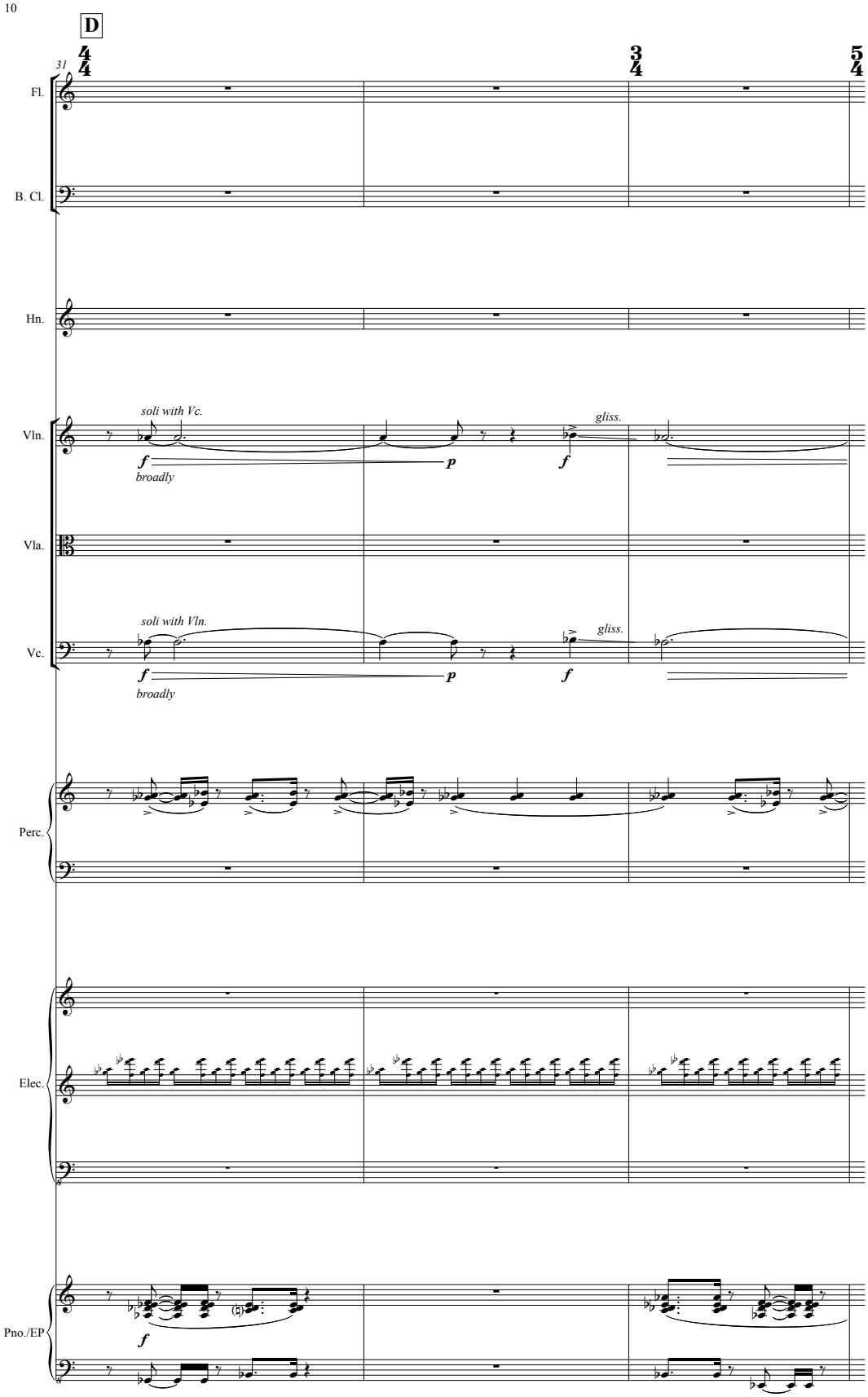

C
15
3/4
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
mf
Pno./EP
f marcato and crisply, not too heavy
Ped.
Ped.

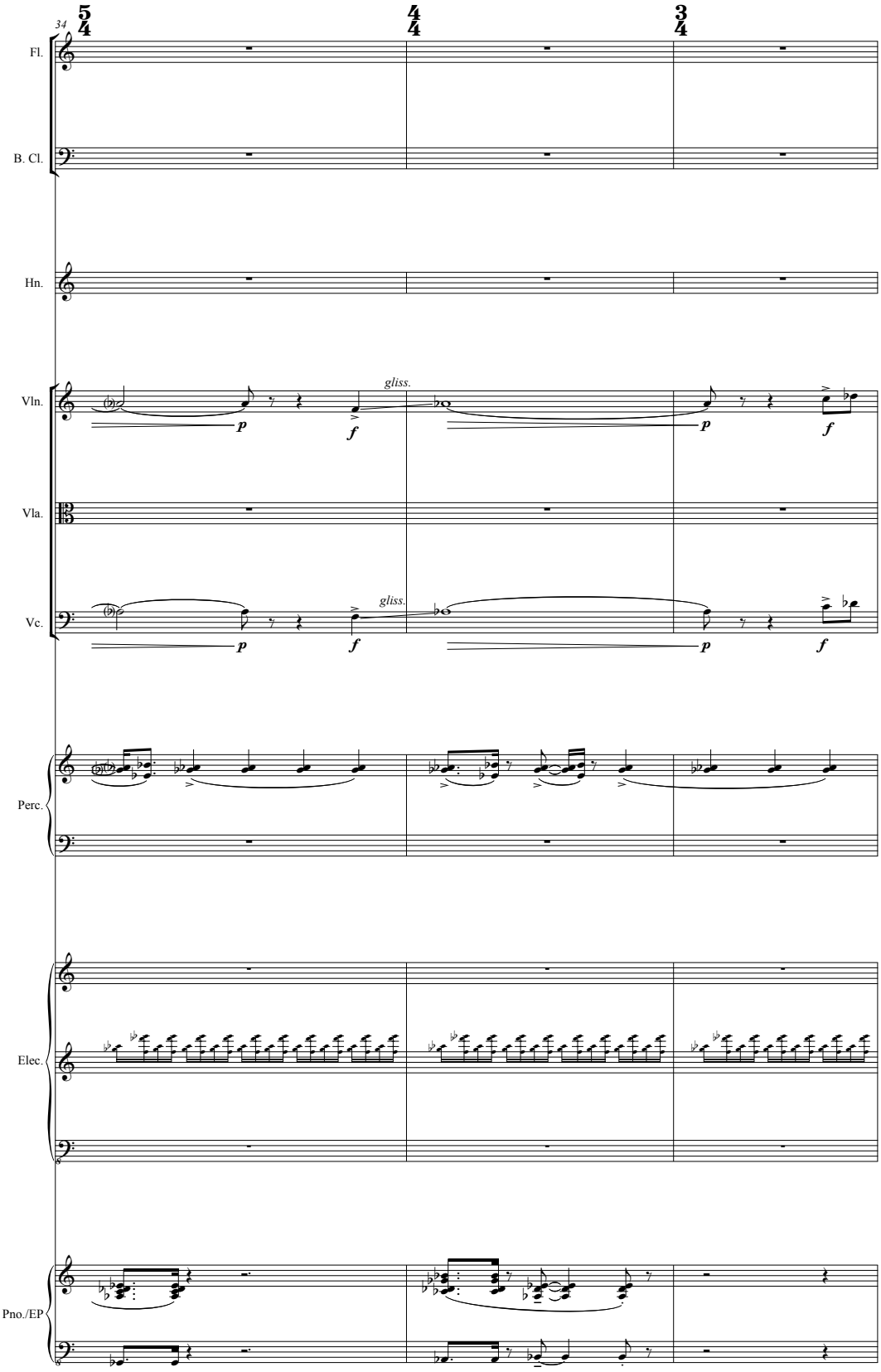

18
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
articulation and pedaling sim.
Ped.

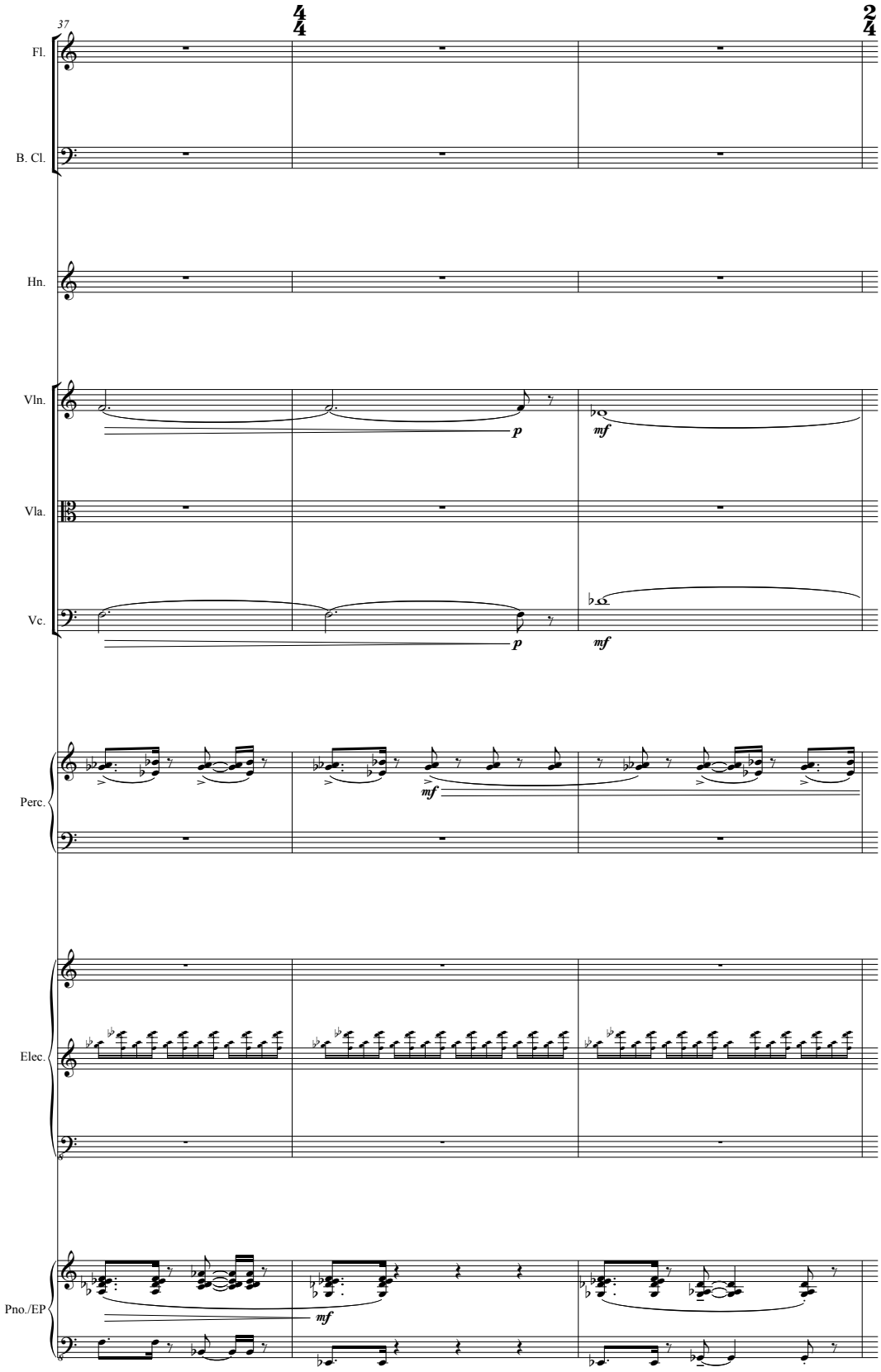

21
4
4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

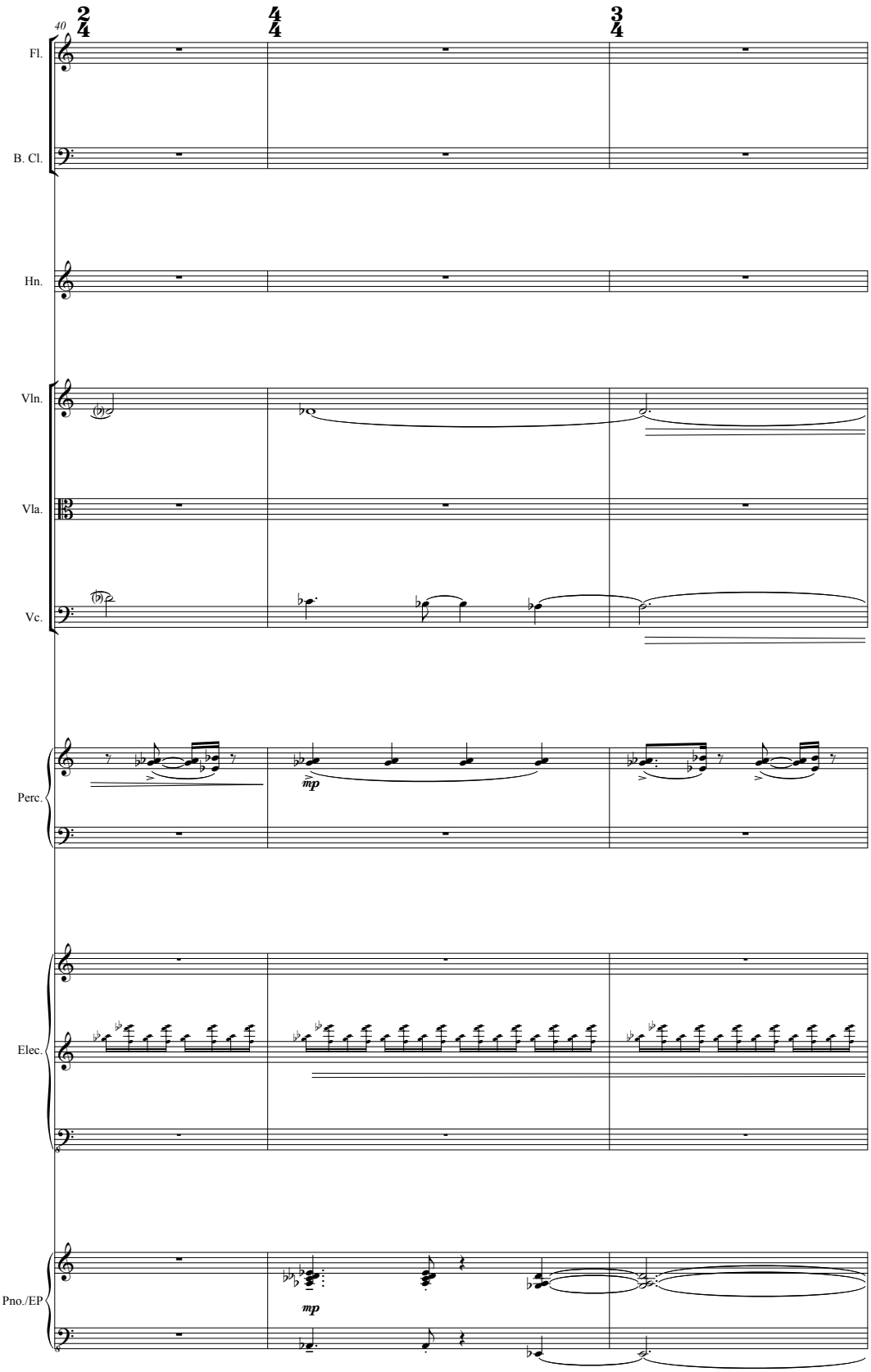

24
5/4
3/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

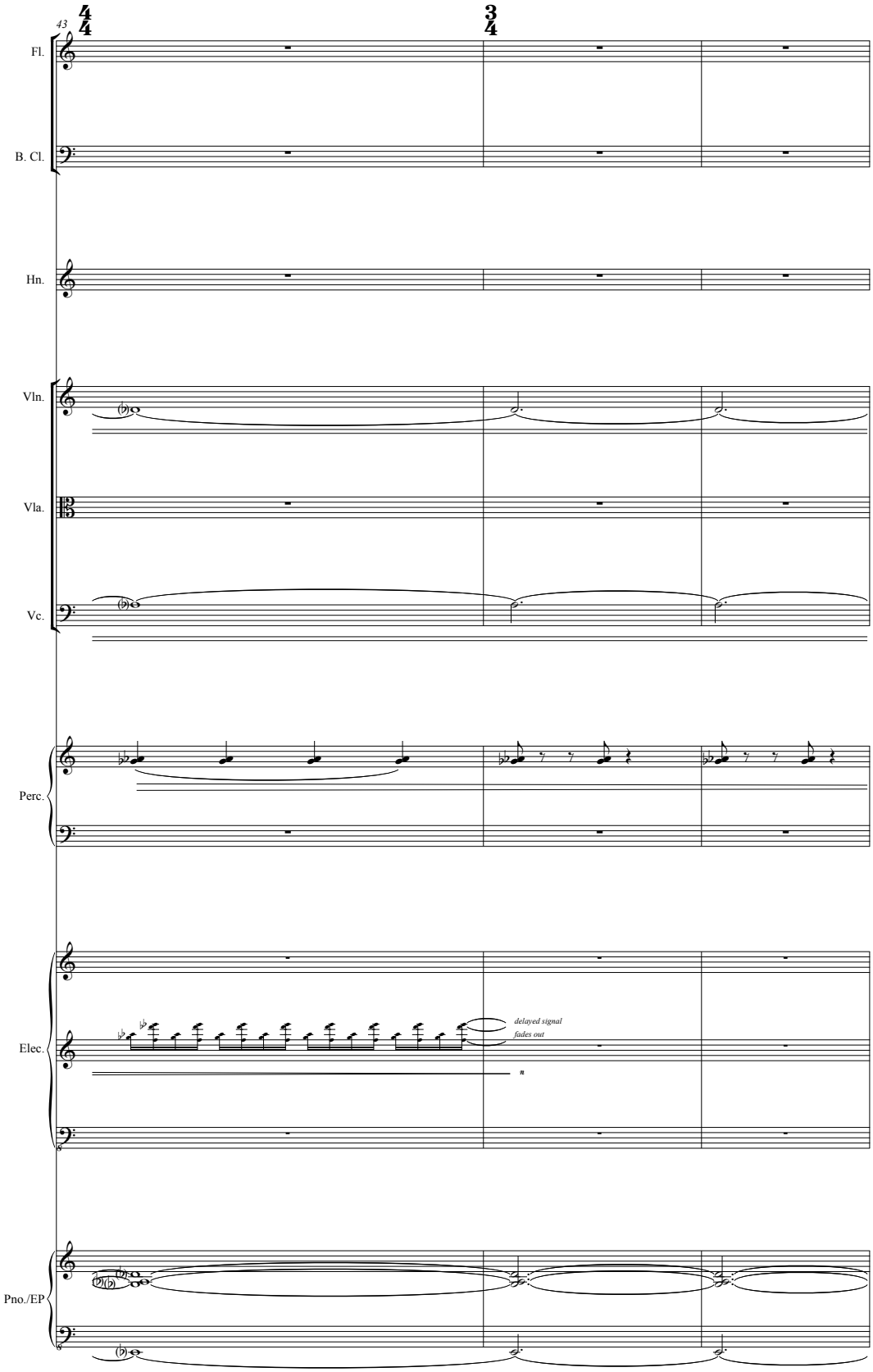

27
4
4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
mf

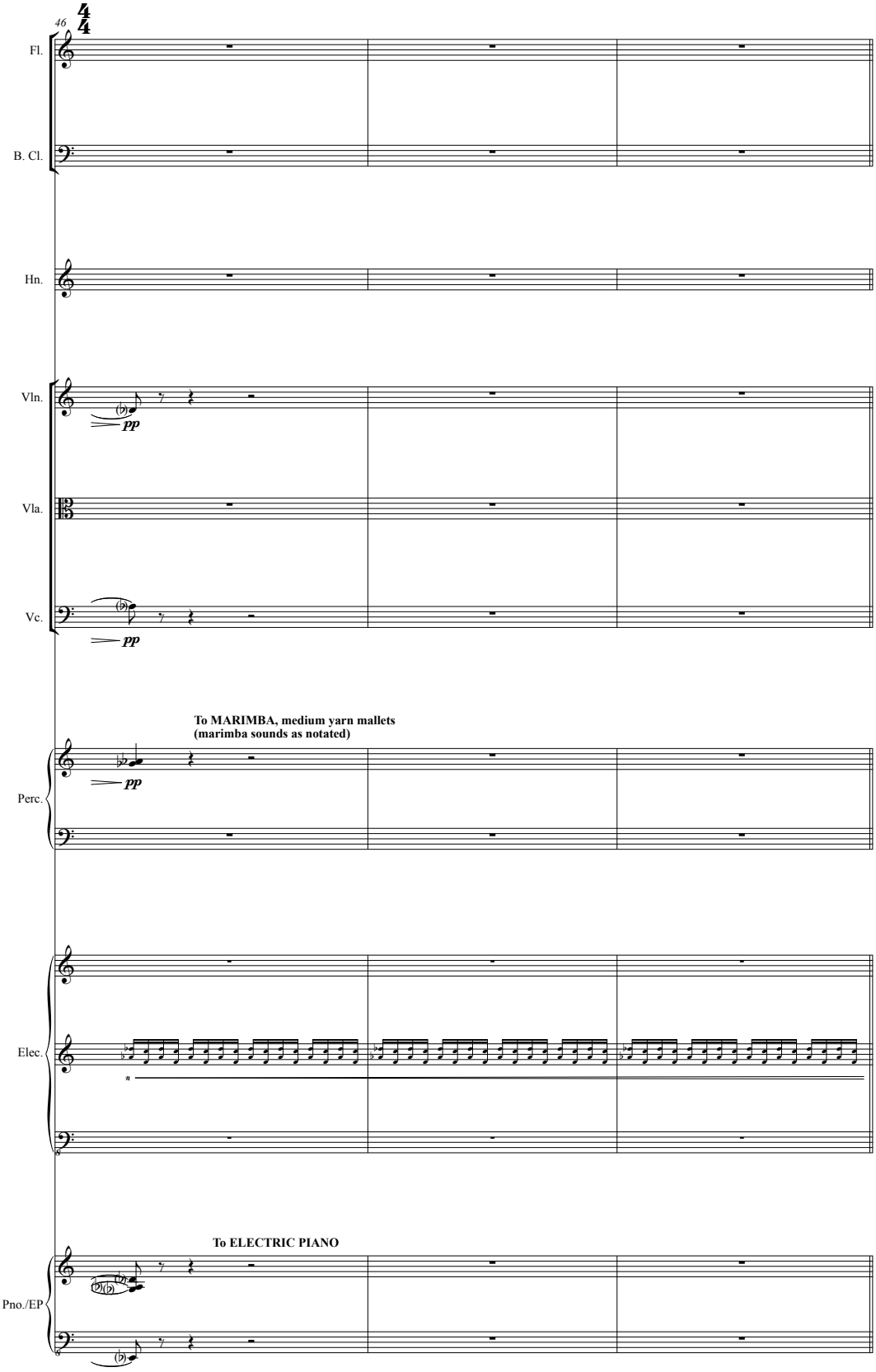

10
D
31
4/4
3/4
5/4
Fl.
B. Cl.
Hn.
Vln.
soli with Vc.
f
broadly
p
f
gliss.
Vla.
Vc.
soli with Vln.
f
broadly
p
f
gliss.
Perc.
Elec.
Pno./EP
f


34
5/4
4/4
3/4
Fl.
B. Cl.
Hn.
Vln.
gliss.
p
f
Vla.
Vc.
Perc.
Elec.
Pno./EP


37
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
p
mf
p
mf
mf
mf

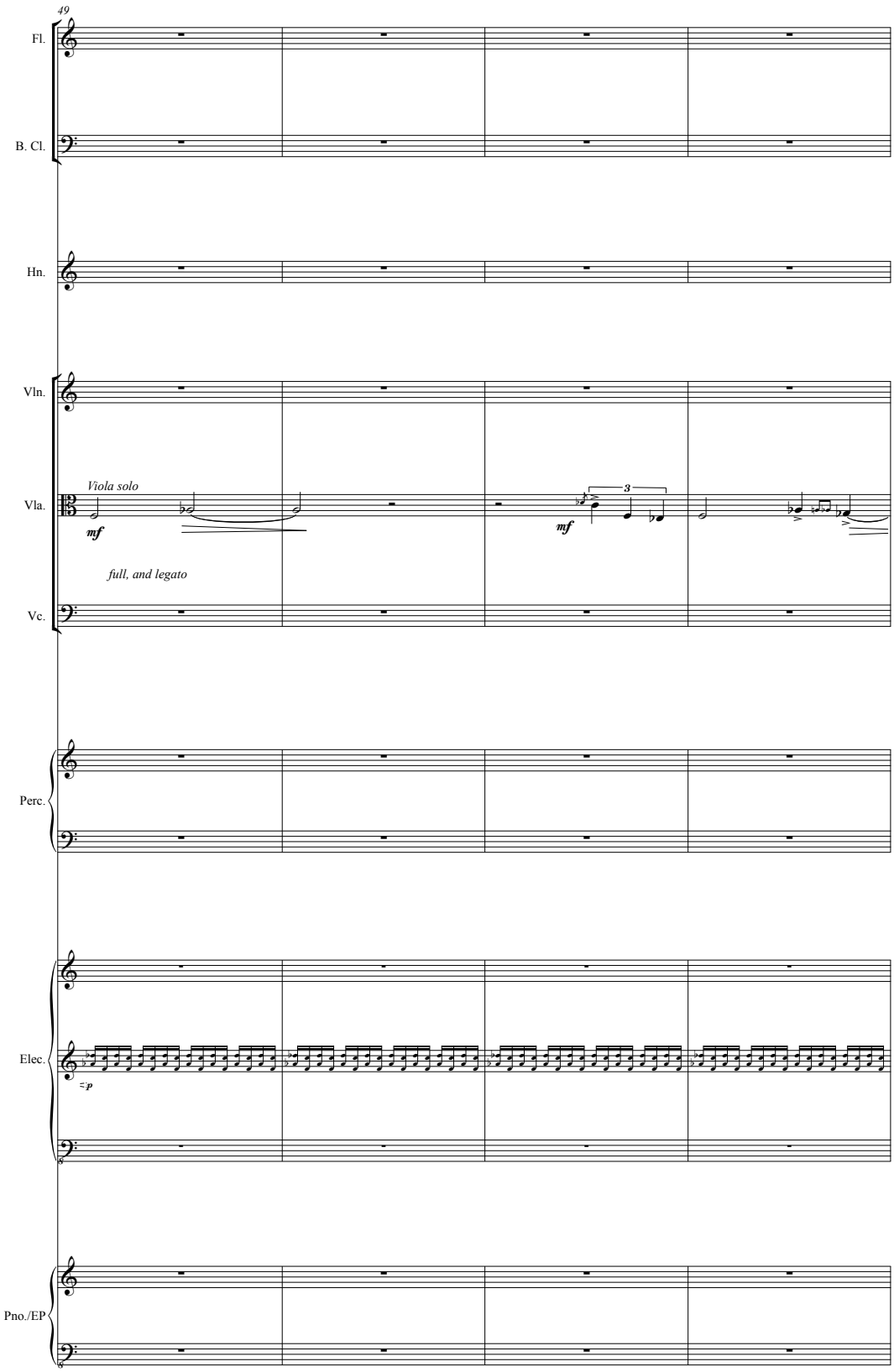

40
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
mp
mp

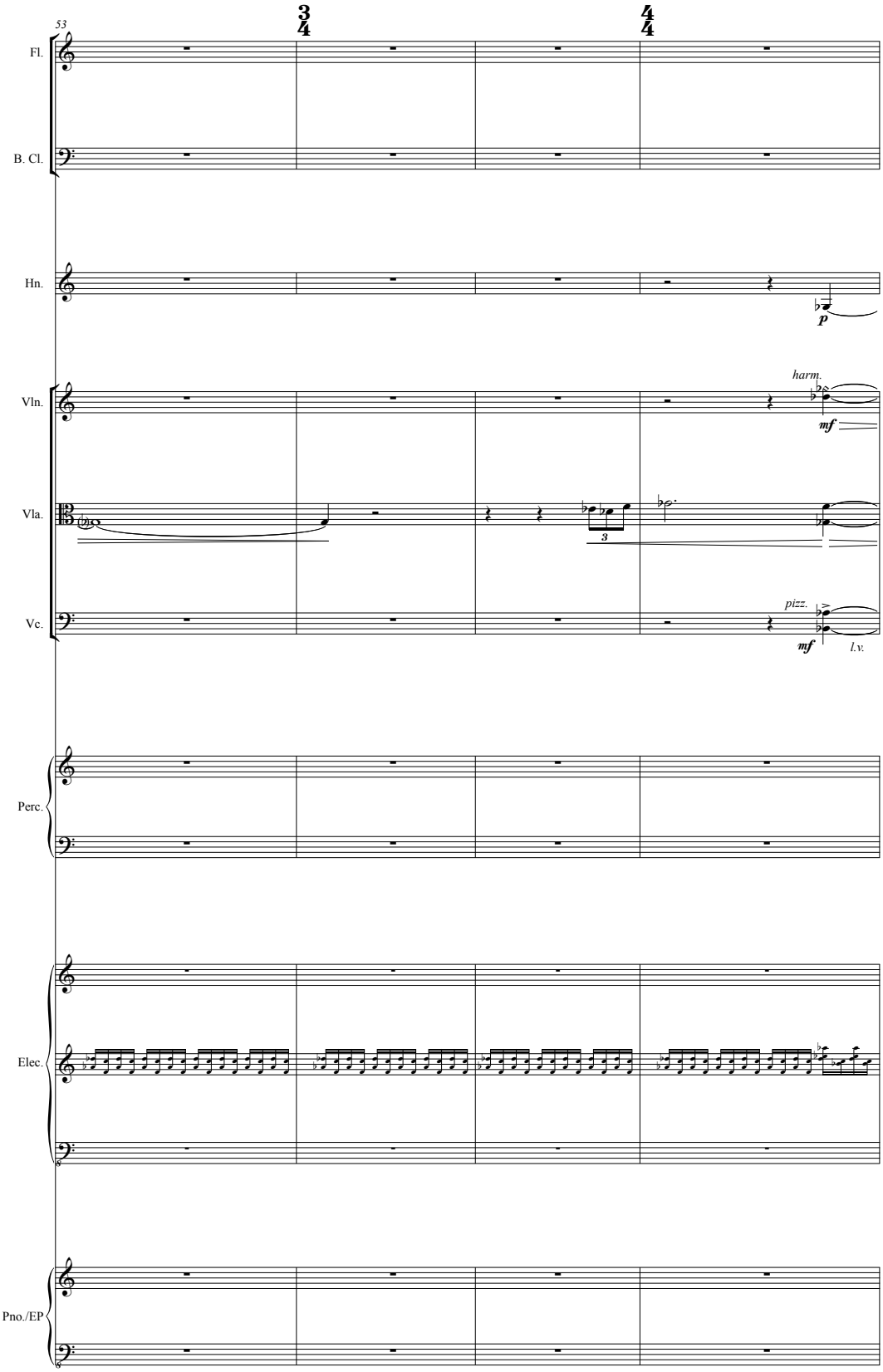

43
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
delayed signal
fades out
Pno./EP

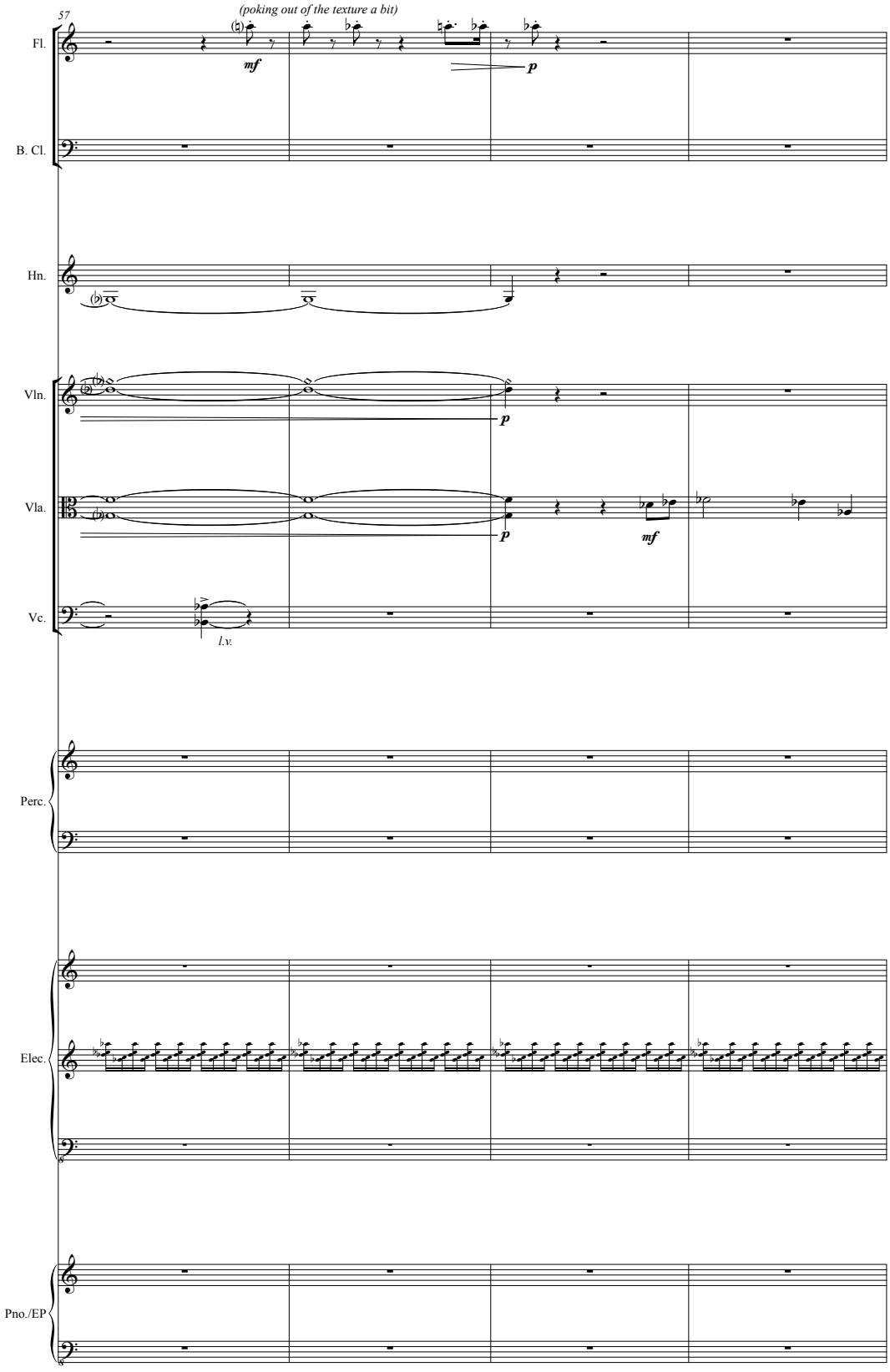

46
Fl.
B. Cl.
Hn.
Vln.
pp
Vla.
Vc.
pp
To MARIMBA, medium yarn mallets
(marimba sounds as notated)
Perc.
pp
Elec.
To ELECTRIC PIANO
Pno./EP

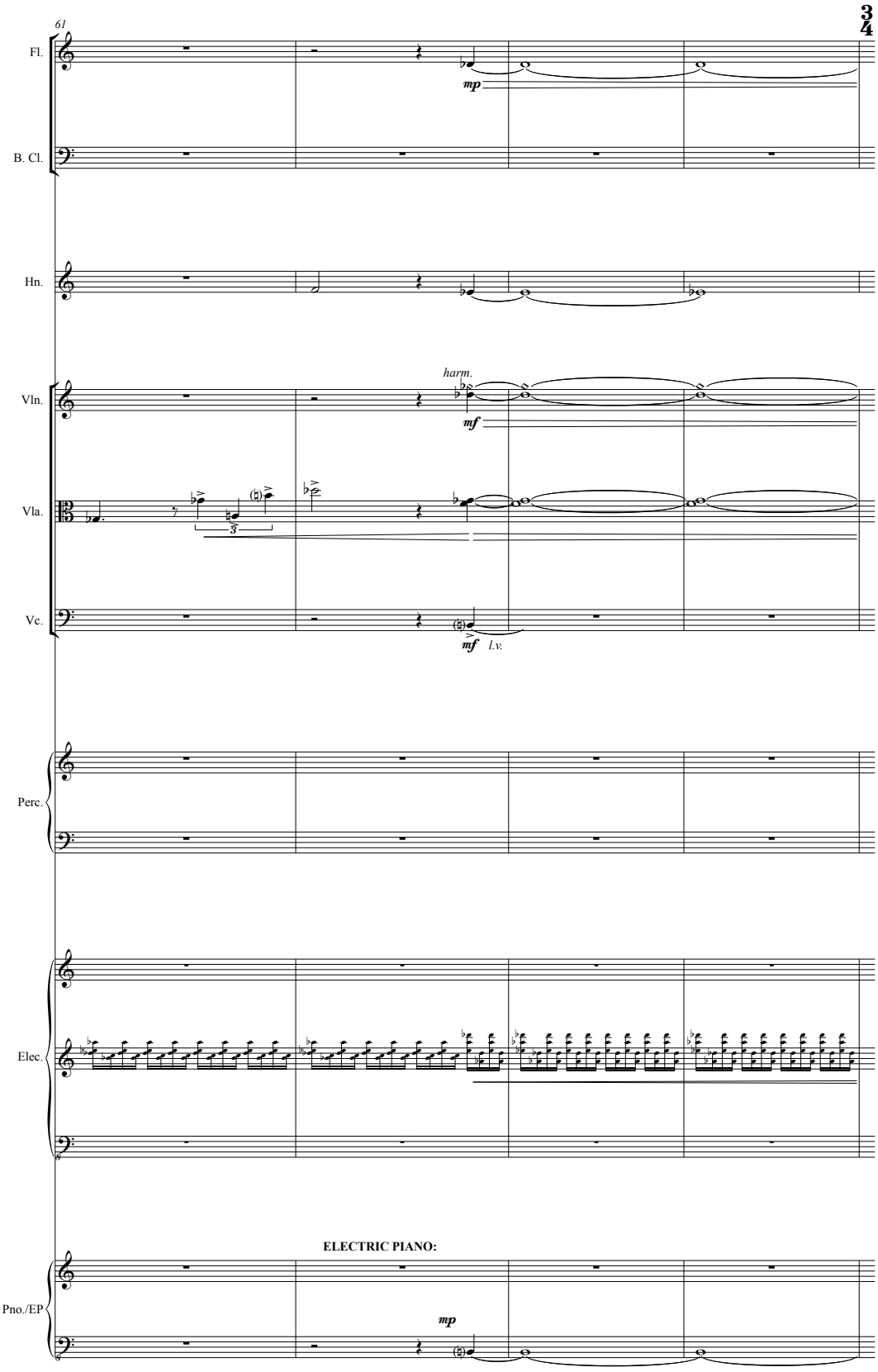
16

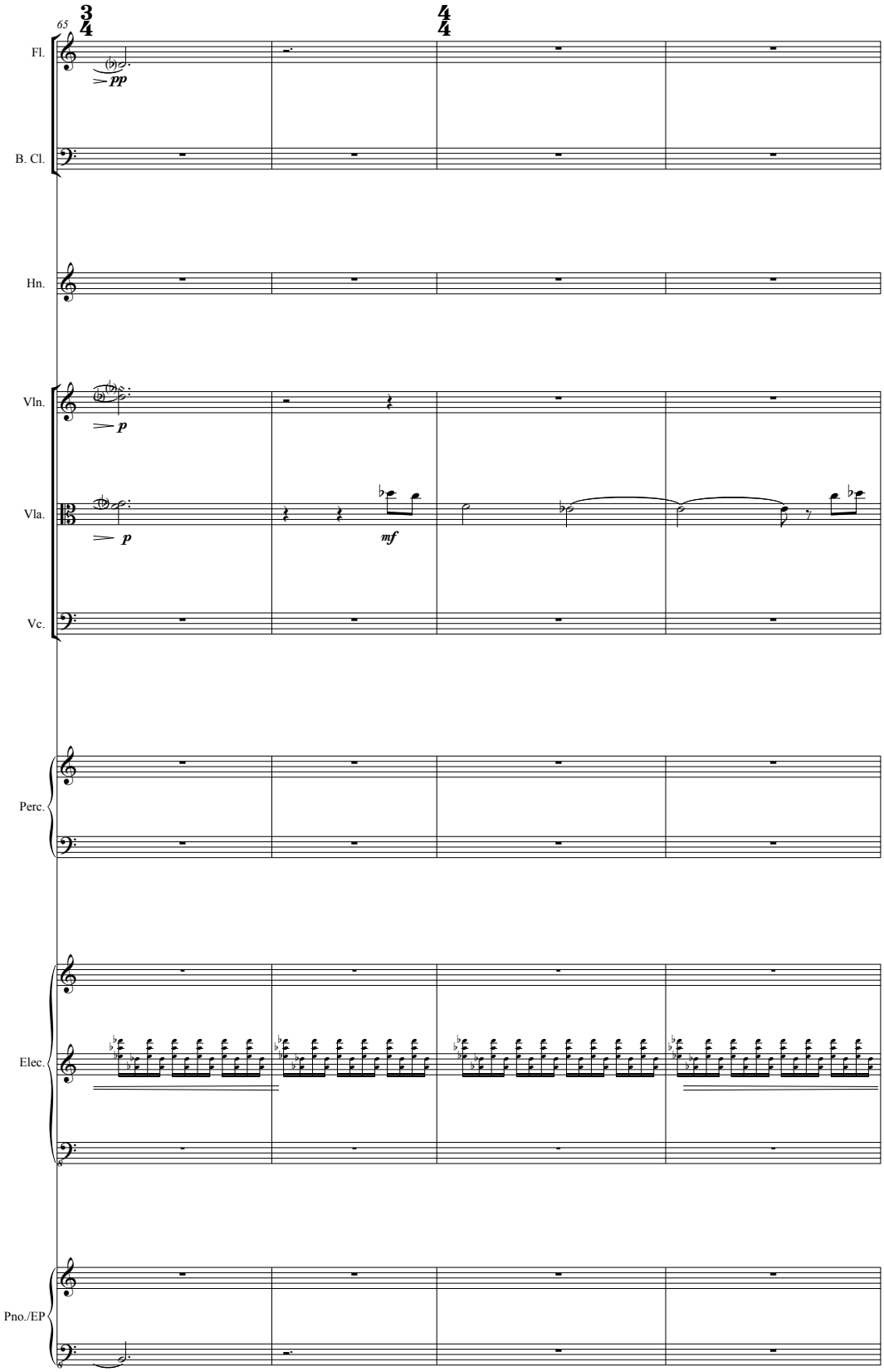
E **VIOLA SOLO**

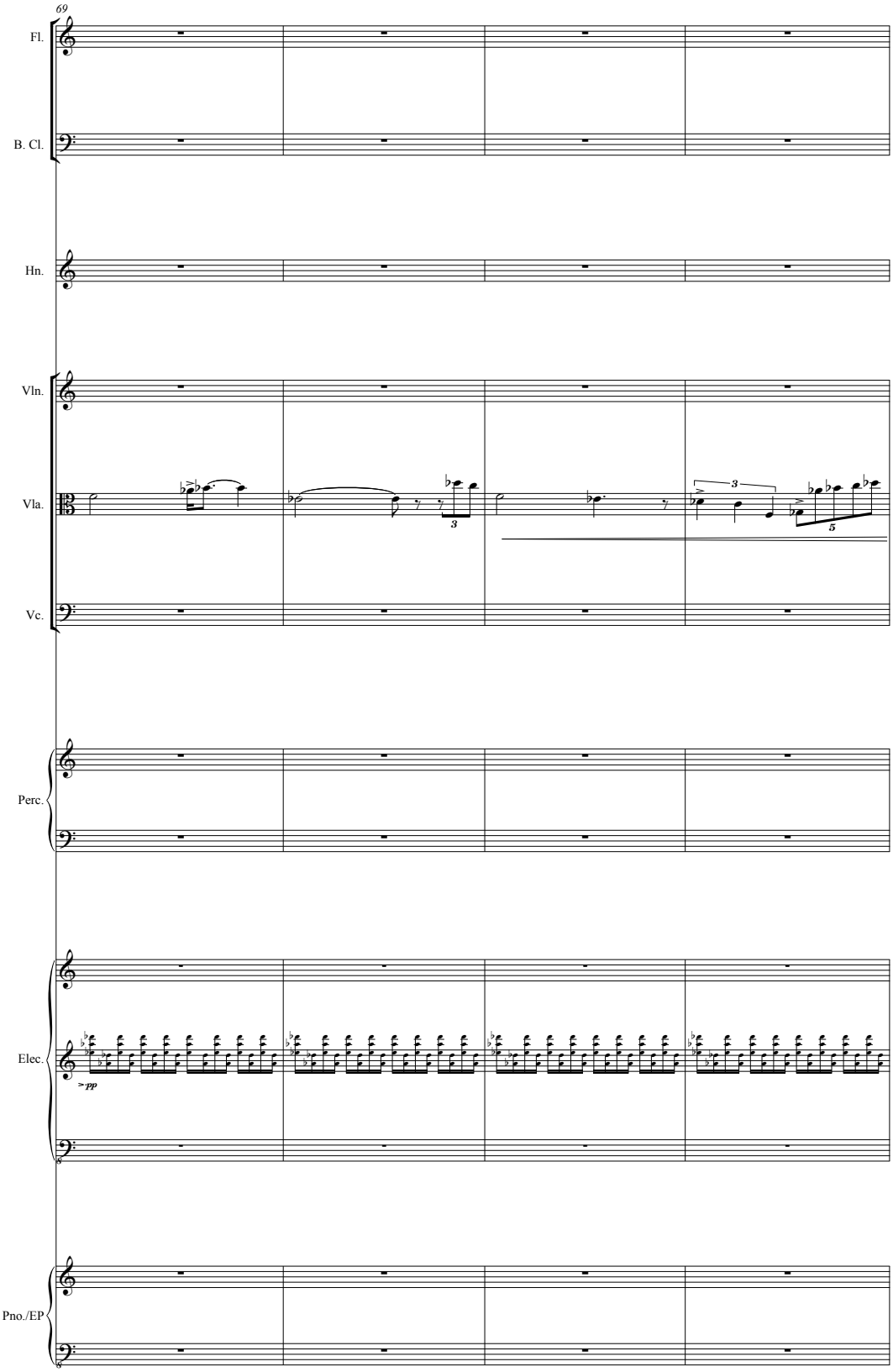


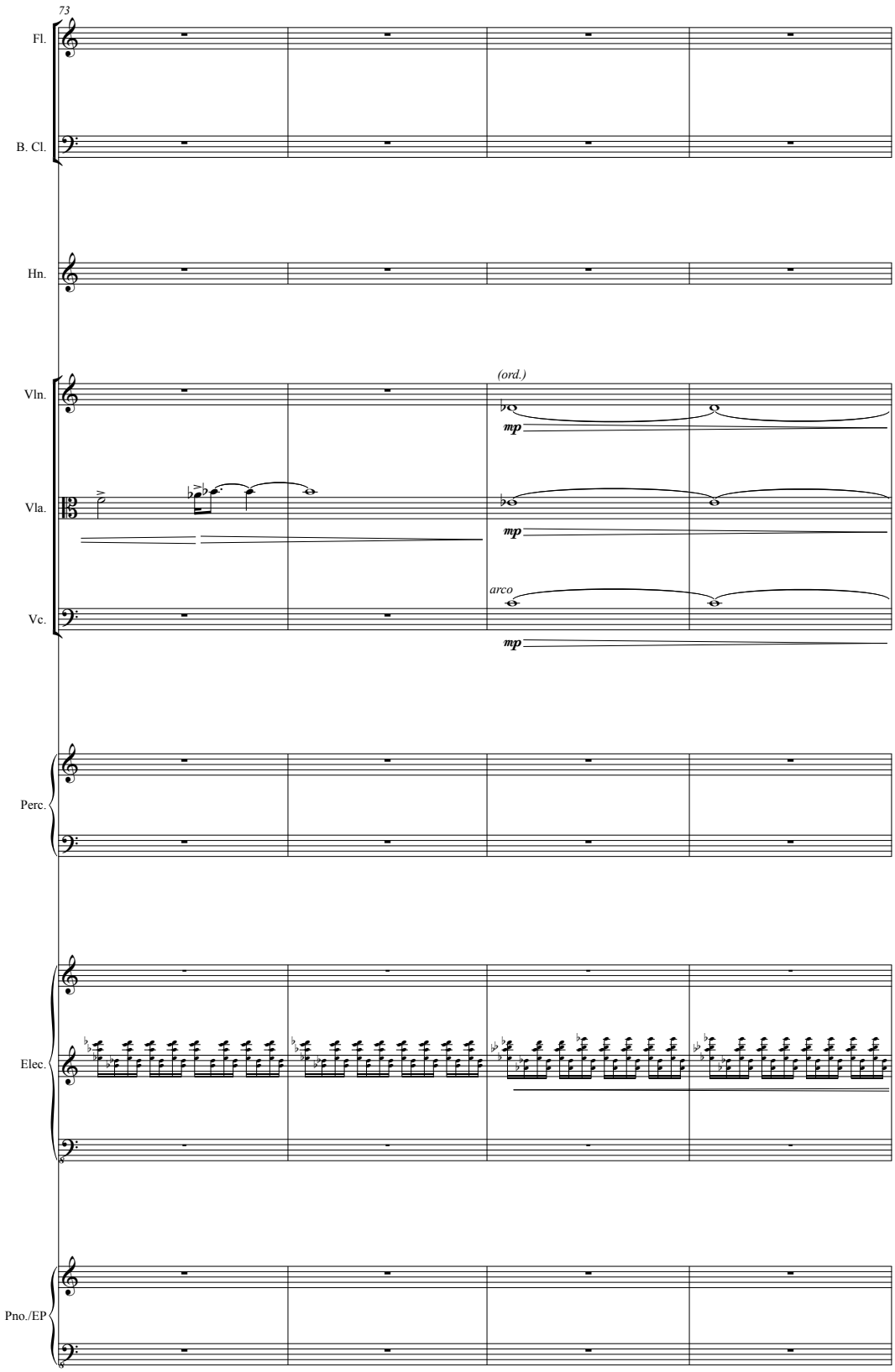

53
3/4
4/4
Fl.
B. Cl.
Hn.
p
Vln.
harm.
mf
Vla.
3
Vc.
pizz.
mf
l.v.
Perc.
Elec.
Pno./EP

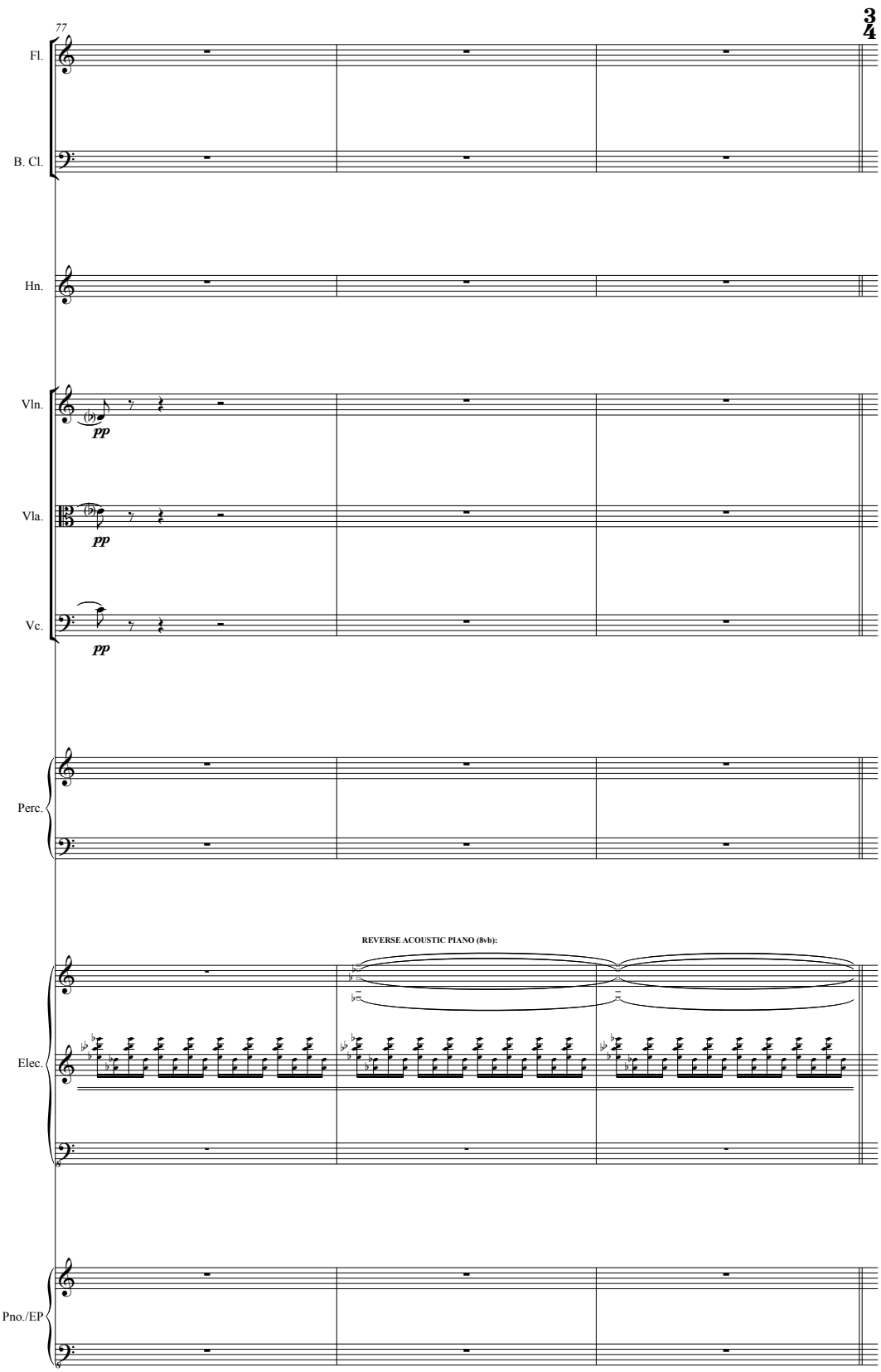

57
(poking out of the texture a bit)
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
mf
p
l.v.


61
3
4
Fl.
mp
B. Cl.
Hn.
harm.
Vln.
mf
Vla.
3
Vc.
mf l.v.
Perc.
Elec.
ELECTRIC PIANO:
Pno./EP
mp

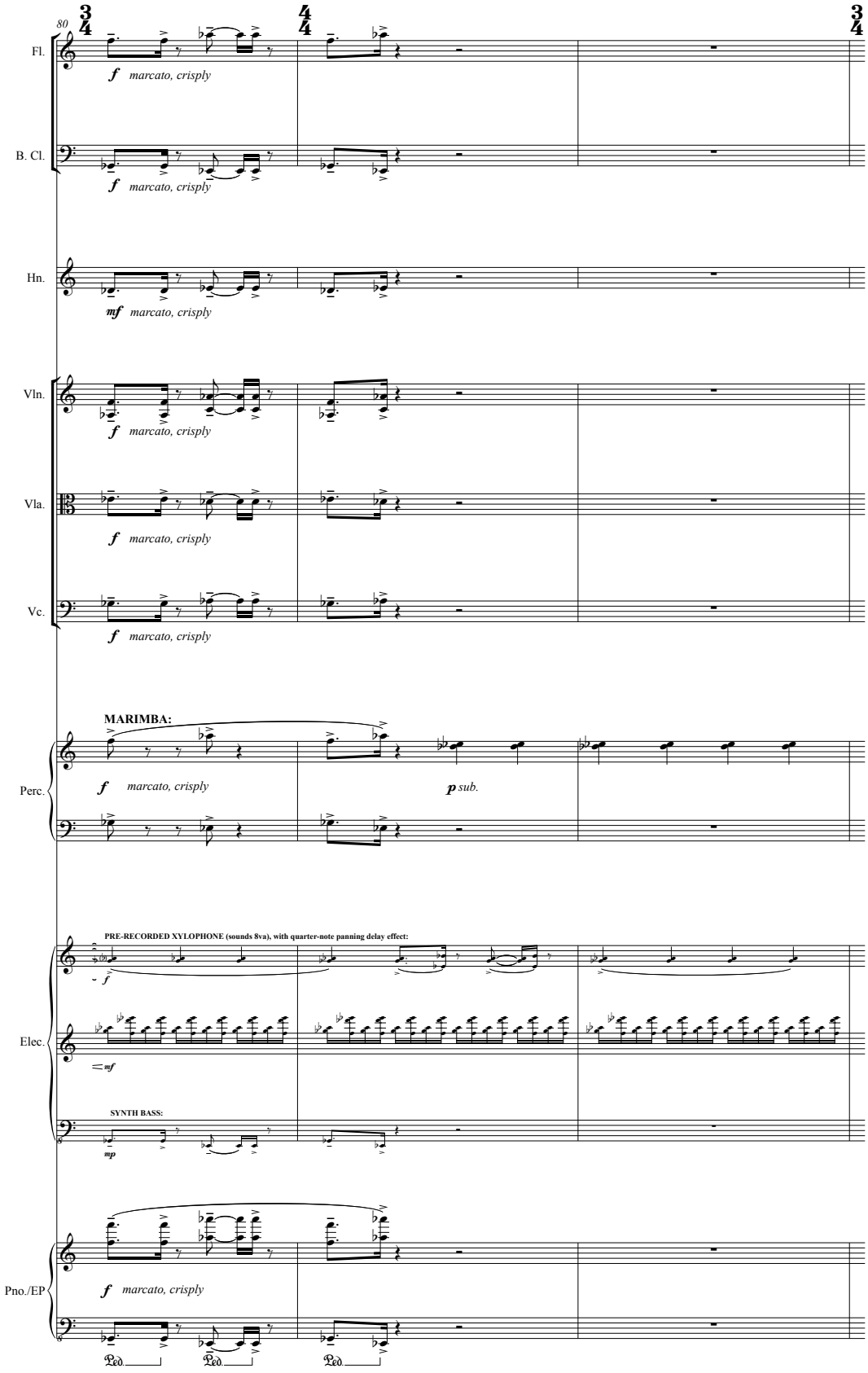

65
3/4
4/4
Fl.
pp
B. Cl.
Hn.
Vln.
p
Vla.
p
mf
Vc.
Perc.
Elec.
Pno./EP

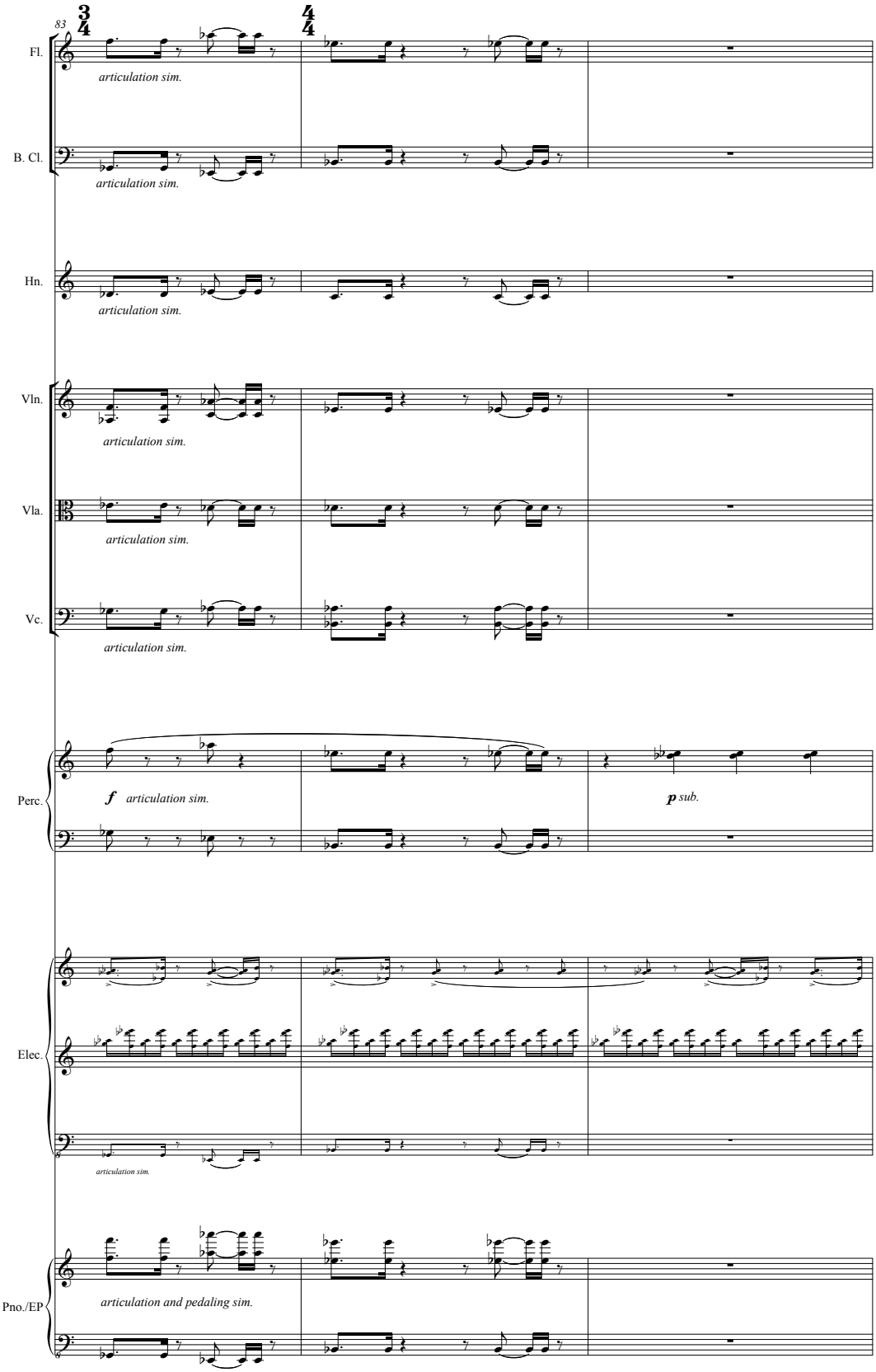

69
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
>pp
Pno./EP

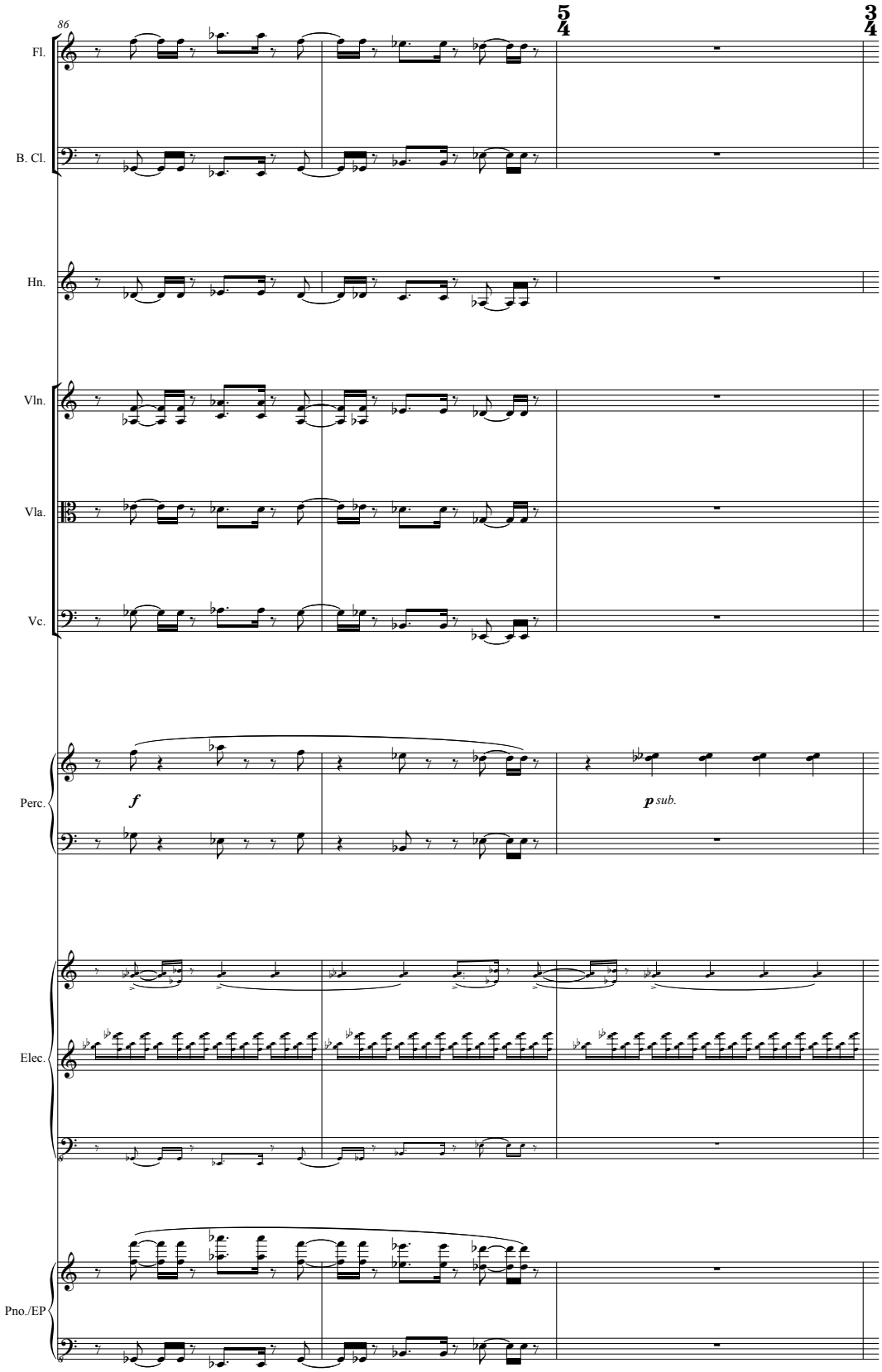

73
Fl.
B. Cl.
Hn.
Vln.
(ord.)
mp
Vla.
mp
arco
Vc.
mp
Perc.
Elec.
Pno./EP

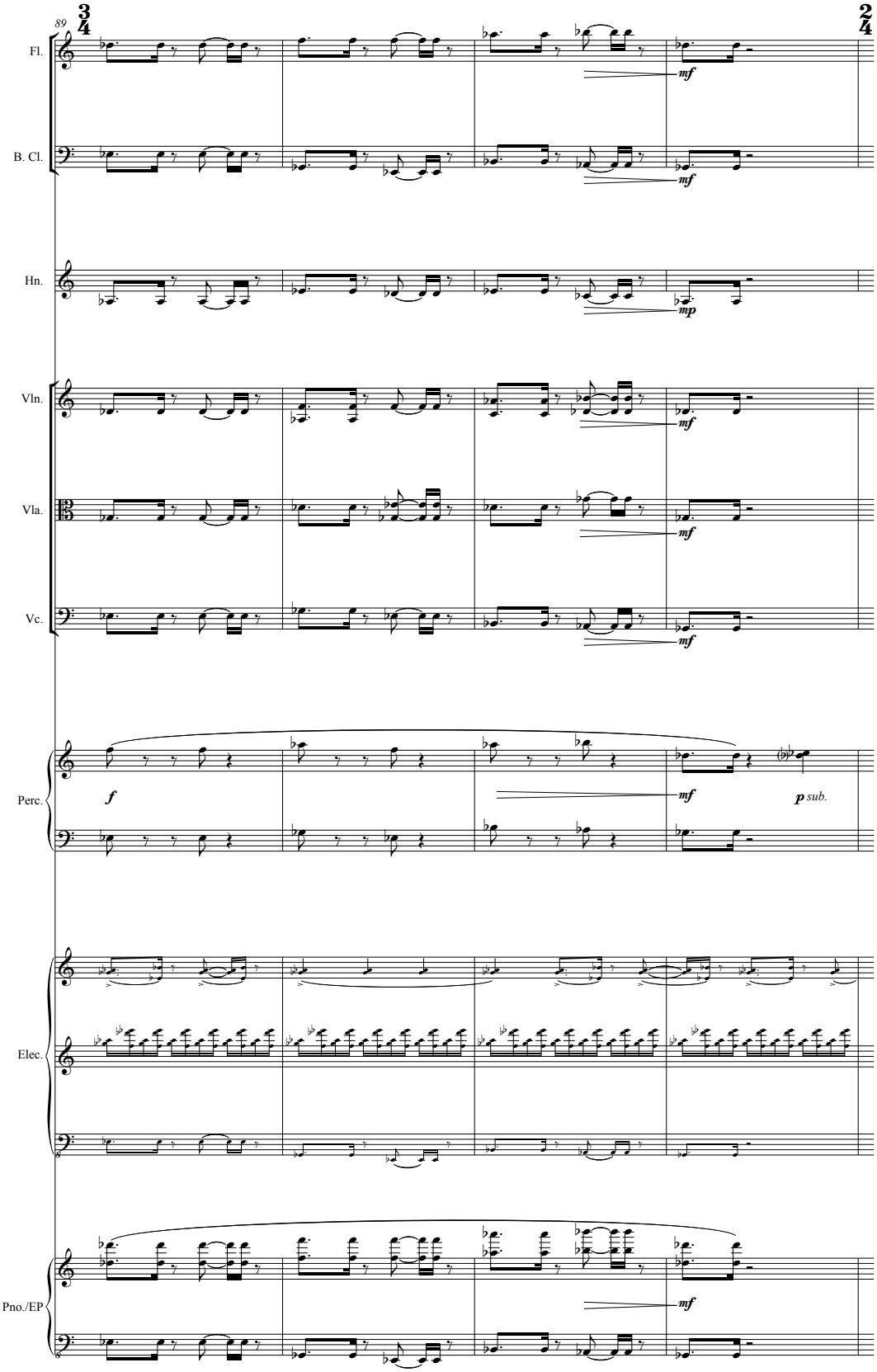

77
3
4
Fl.
B. Cl.
Hn.
Vln.
pp
Vla.
pp
Vc.
pp
Perc.
REVERSE ACOUSTIC PIANO (8vb):
Elec.
Pno./EP

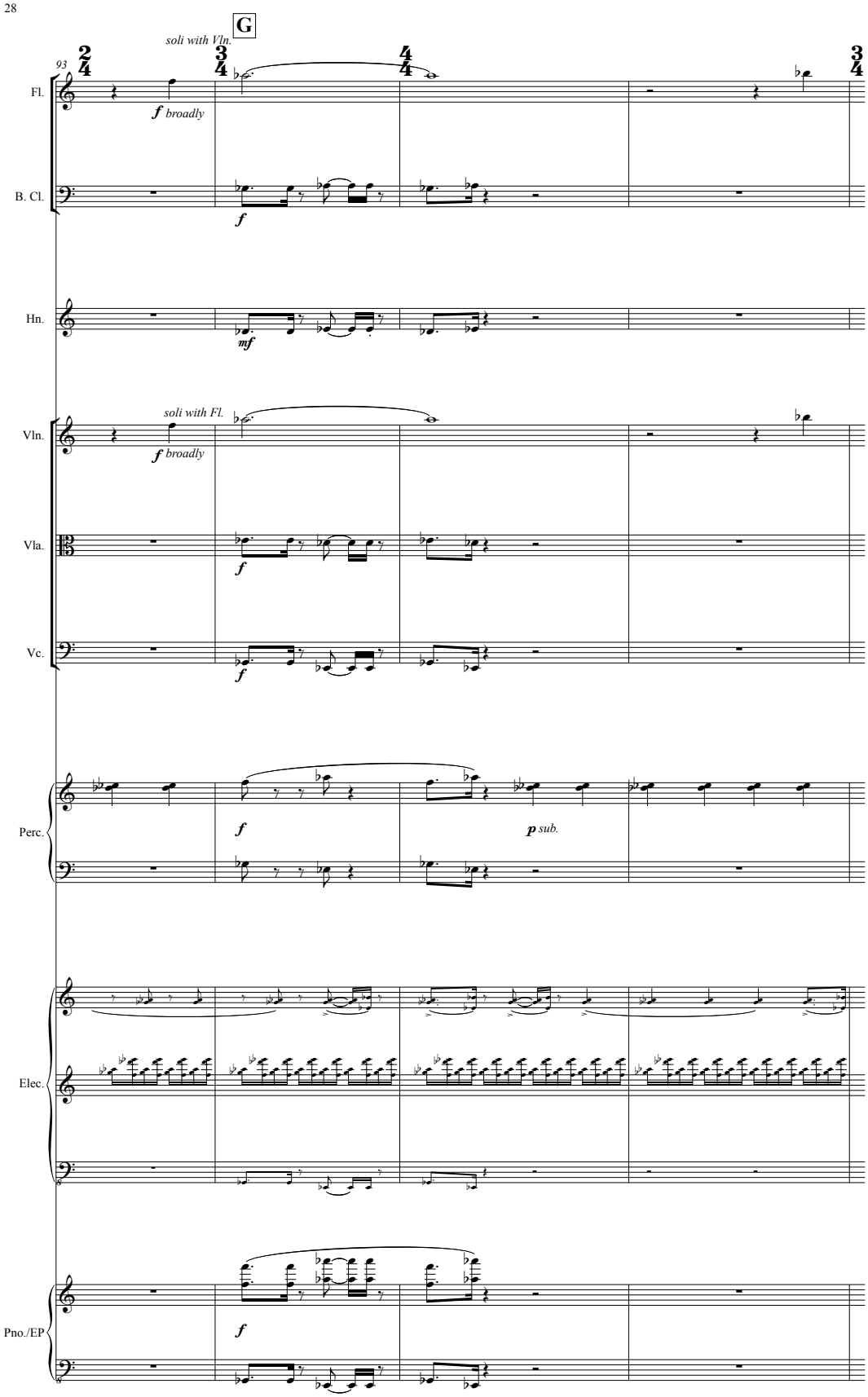
F **TUTTI: FIERY, BUT IN CONTROL**

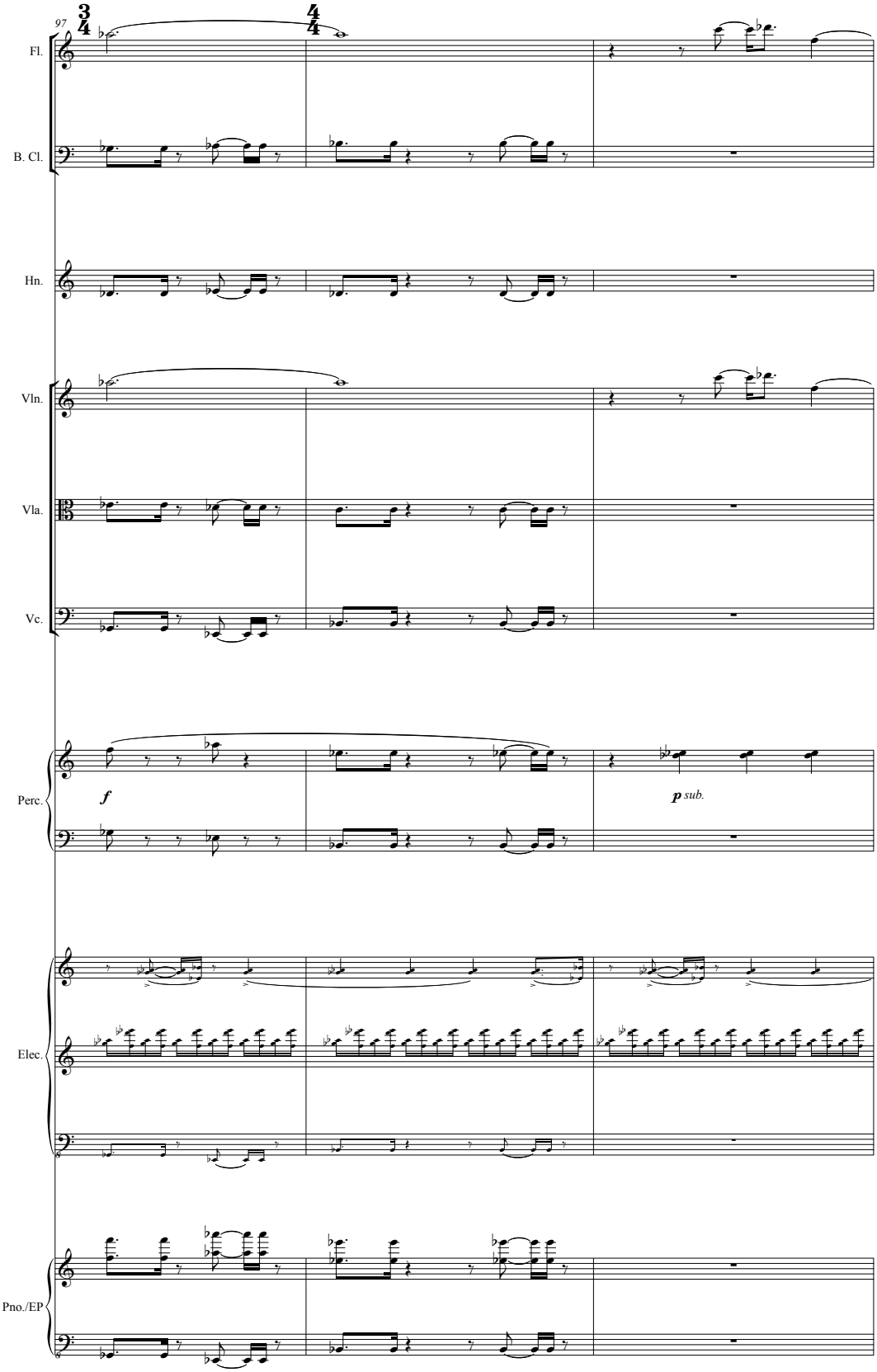


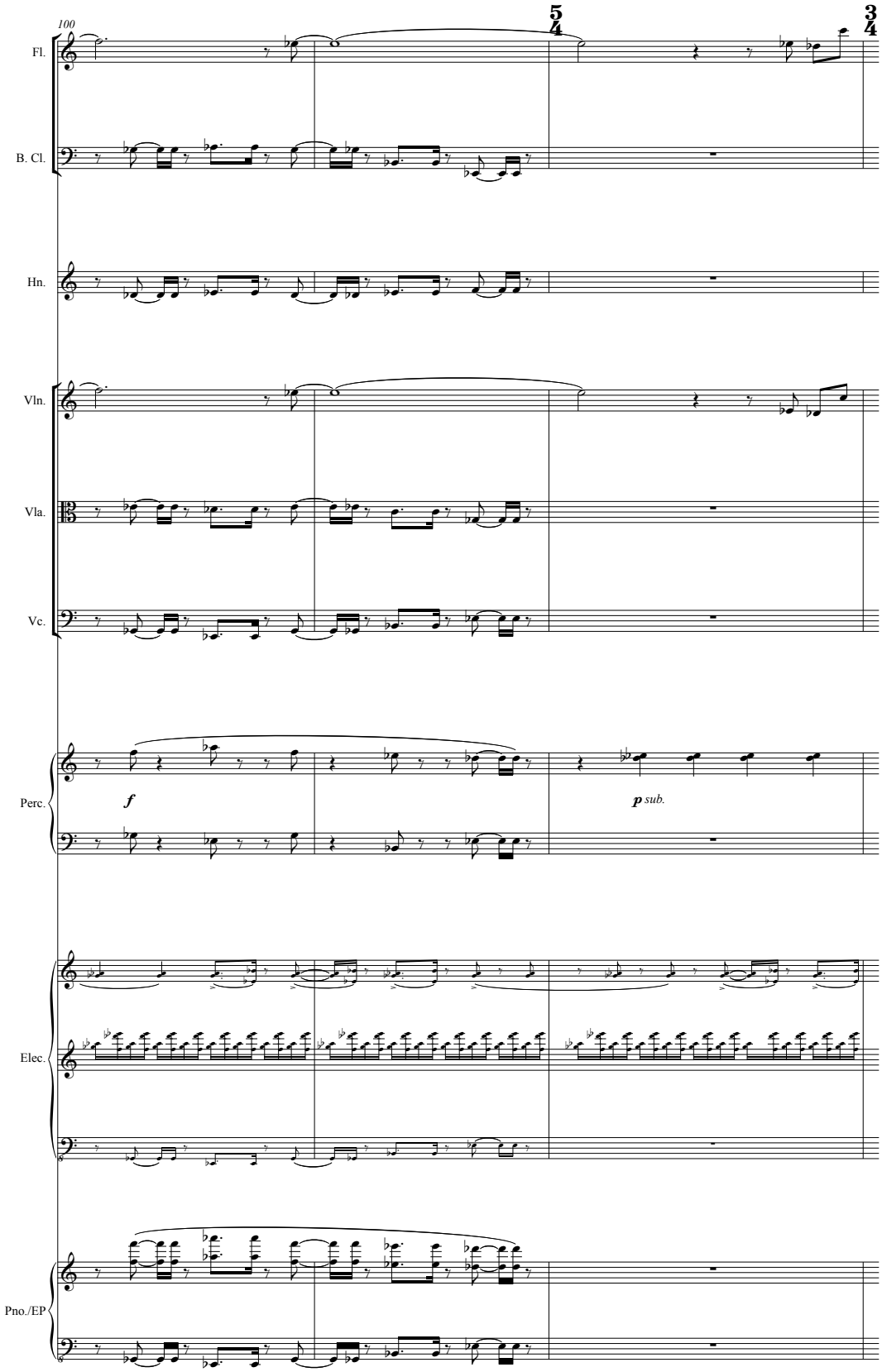

83
3/4
4/4
Fl.
articulation sim.
B. Cl.
articulation sim.
Hn.
articulation sim.
Vln.
articulation sim.
Vla.
articulation sim.
Vc.
articulation sim.
Perc.
f articulation sim.
p sub.
Elec.
articulation sim.
Pno./EP
articulation and pedaling sim.

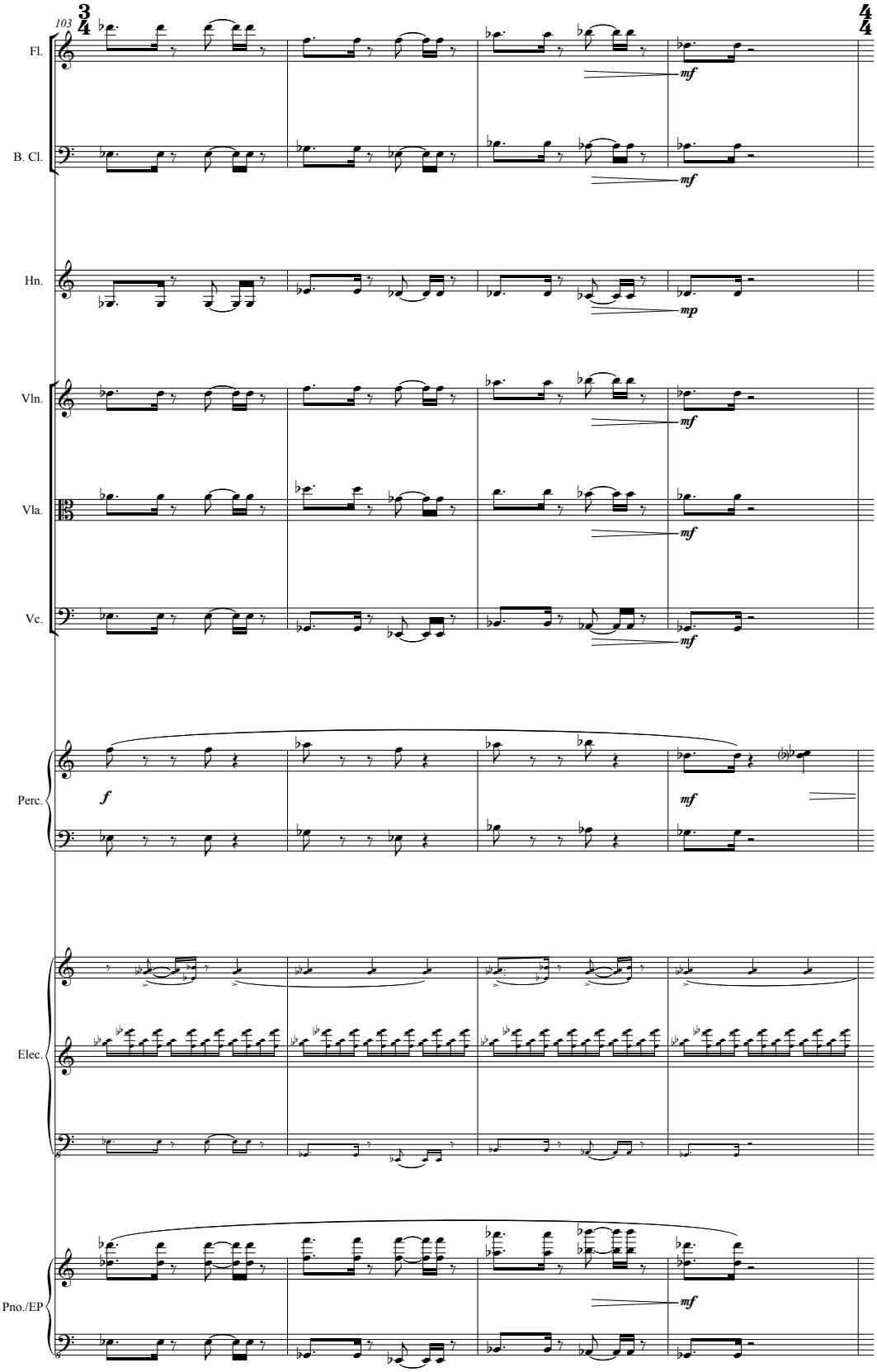

86
5/4
3/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
f
p sub.
Elec.
Pno./EP

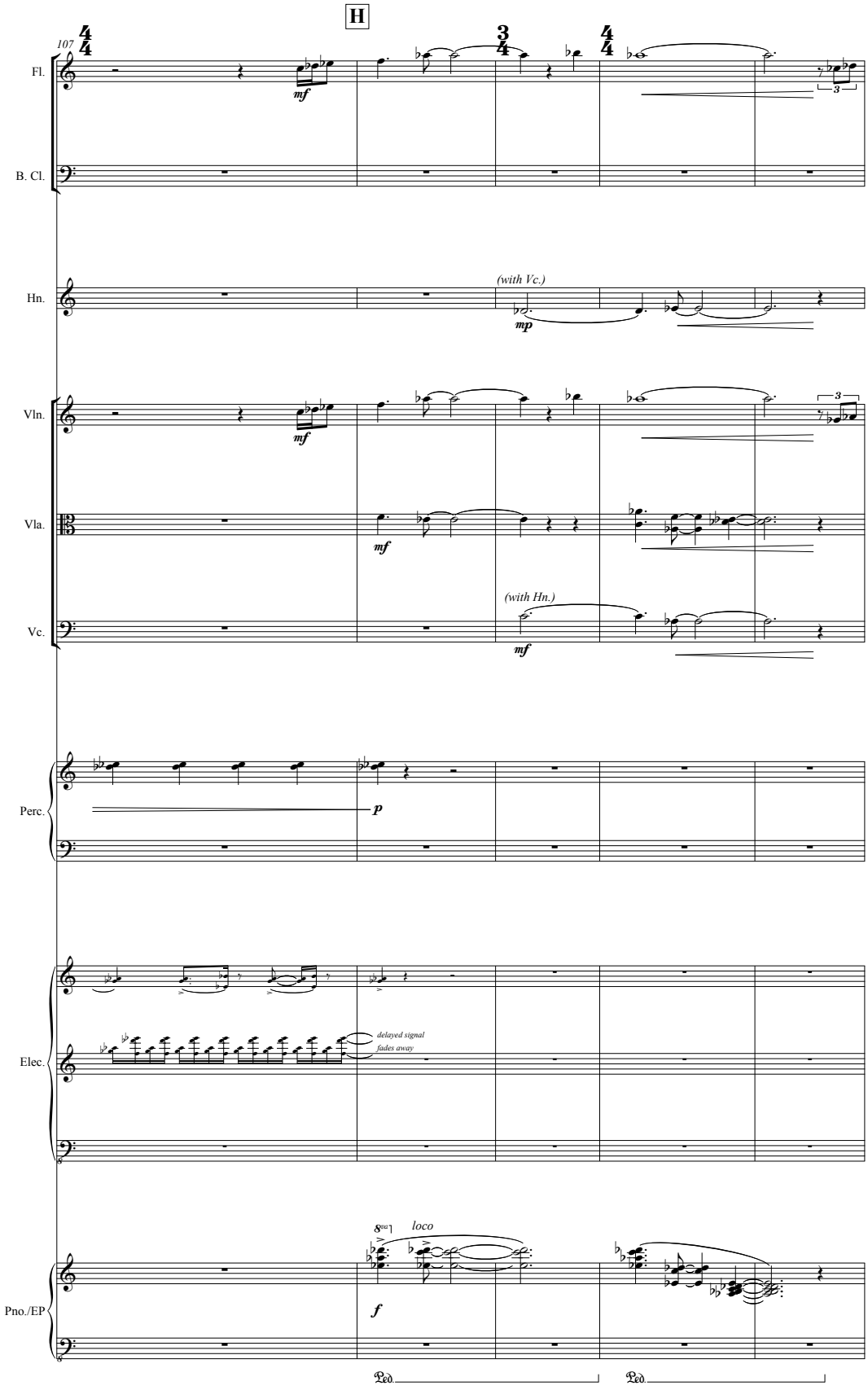

89
3/4
2/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
mf
mp
f
p sub.

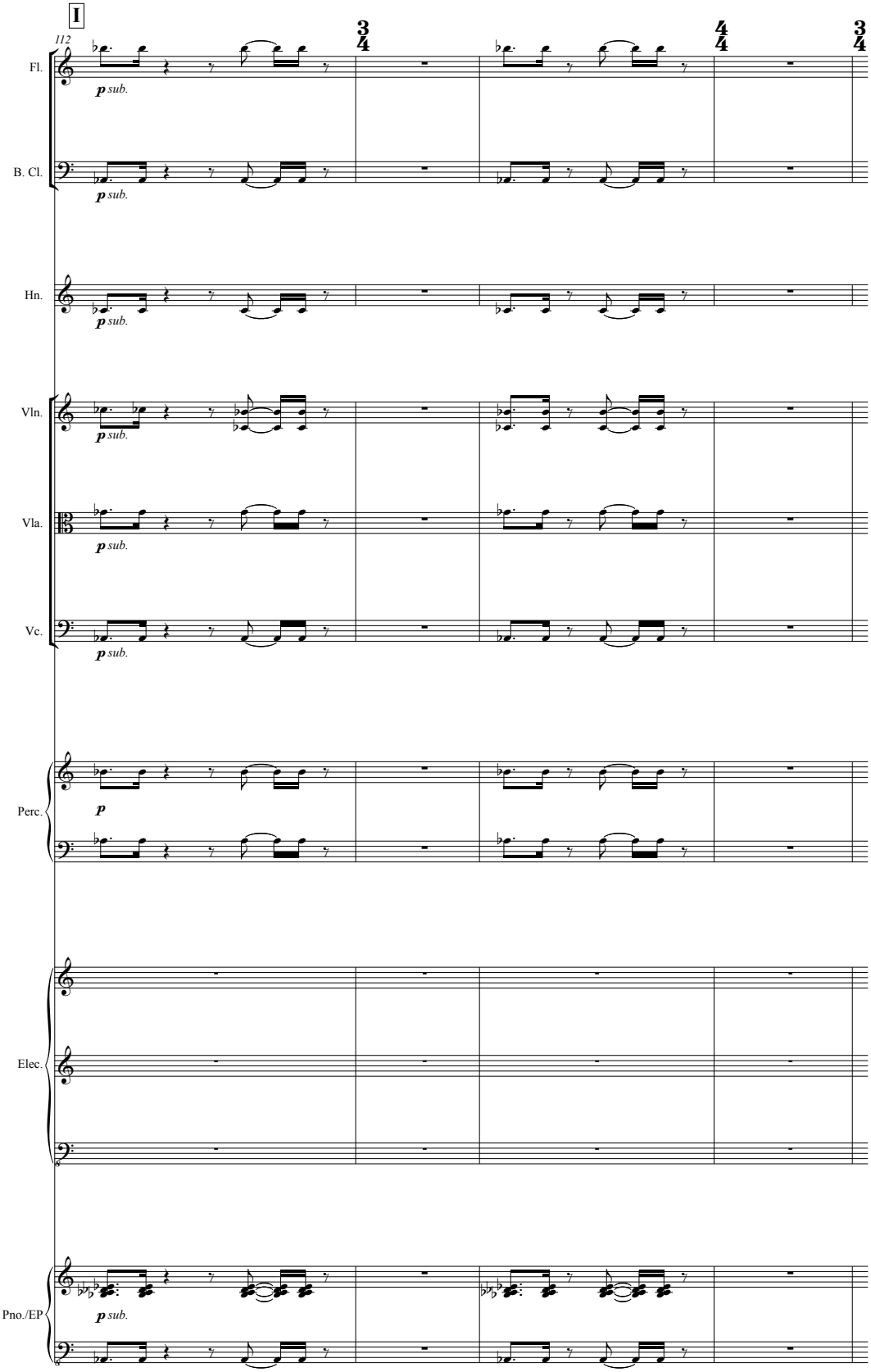

G
soli with Vln.
93
2/4
3/4
4/4
3/4
Fl.
f broadly
B. Cl.
f
Hn.
mf
soli with Fl.
Vln.
f broadly
Vla.
f
Vc.
f
Perc.
f
p sub.
Elec.
Pno./EP
f

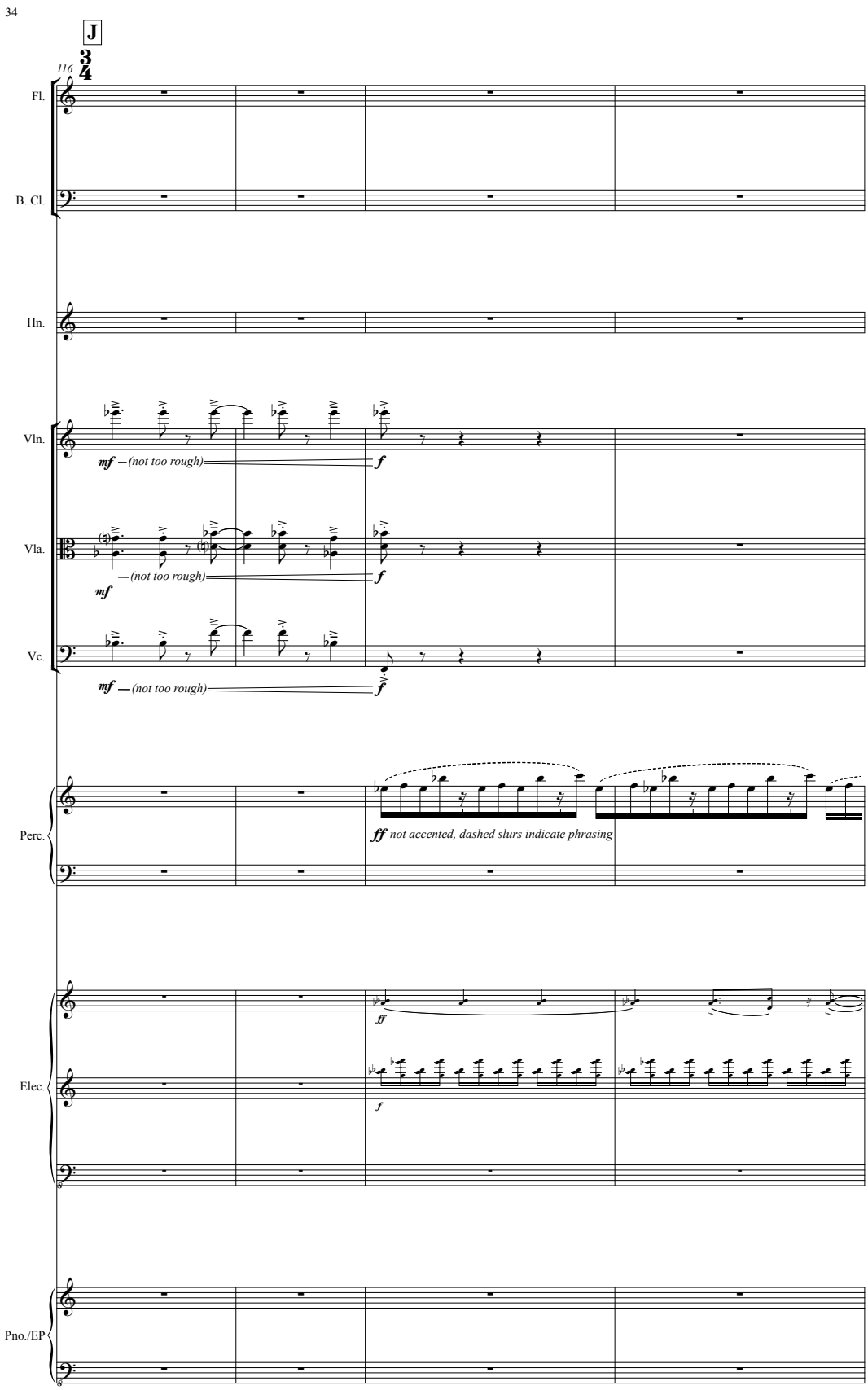

97
3/4
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
f
p sub.
Elec.
Pno./EP

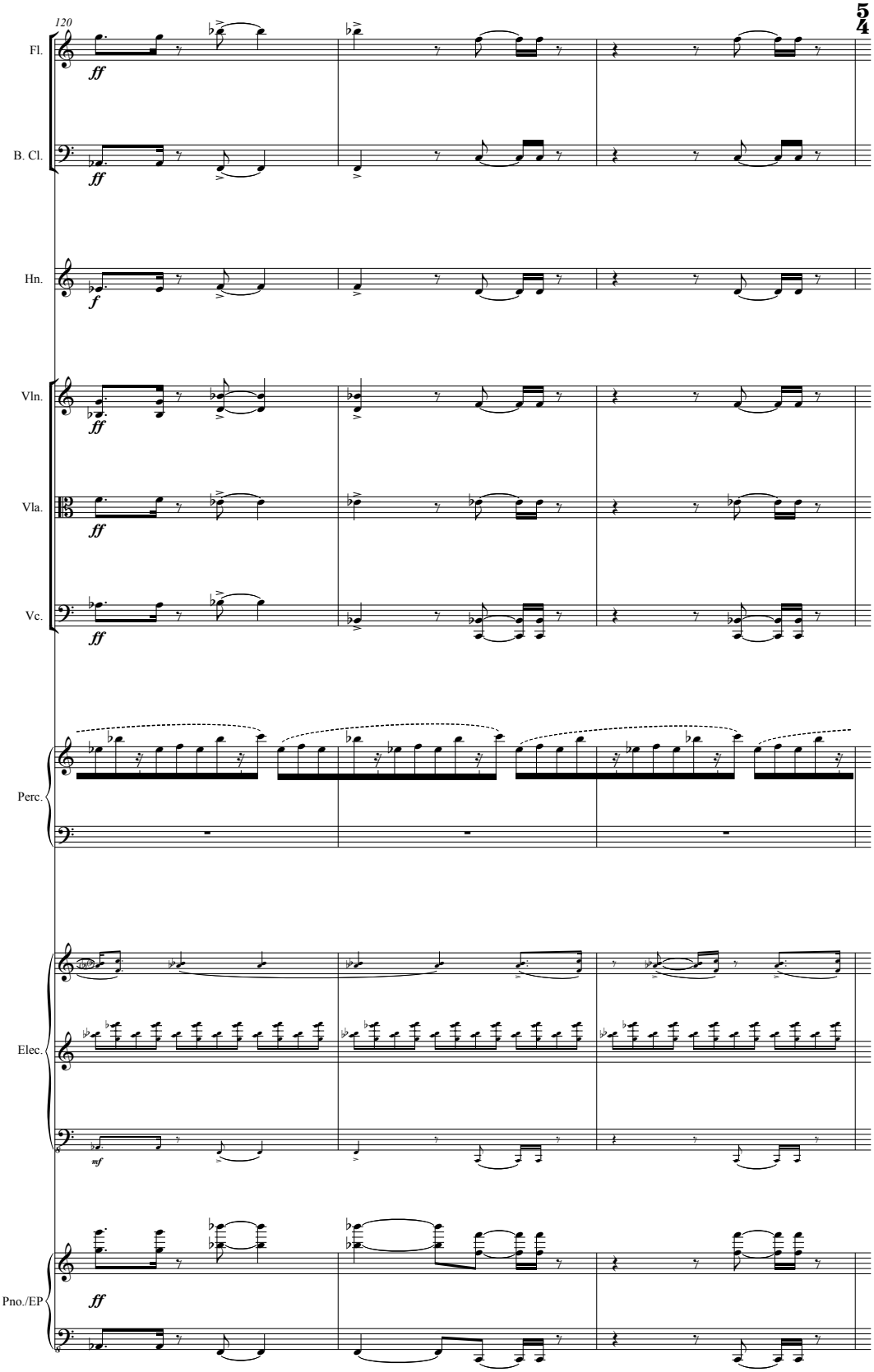

100
5/4
3/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
f
p sub.
Elec.
Pno./EP

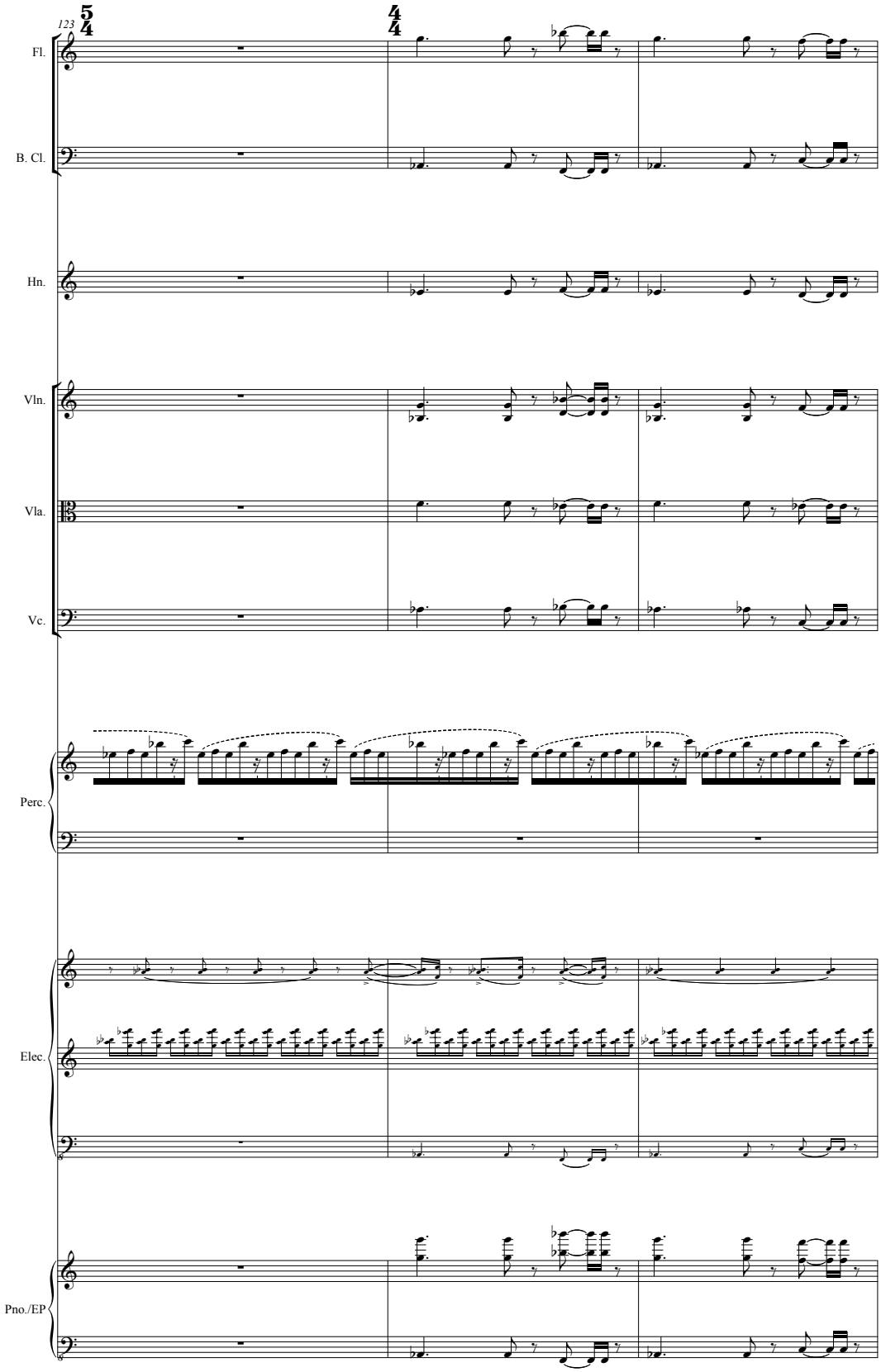

103
3/4
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
mf
mp
f

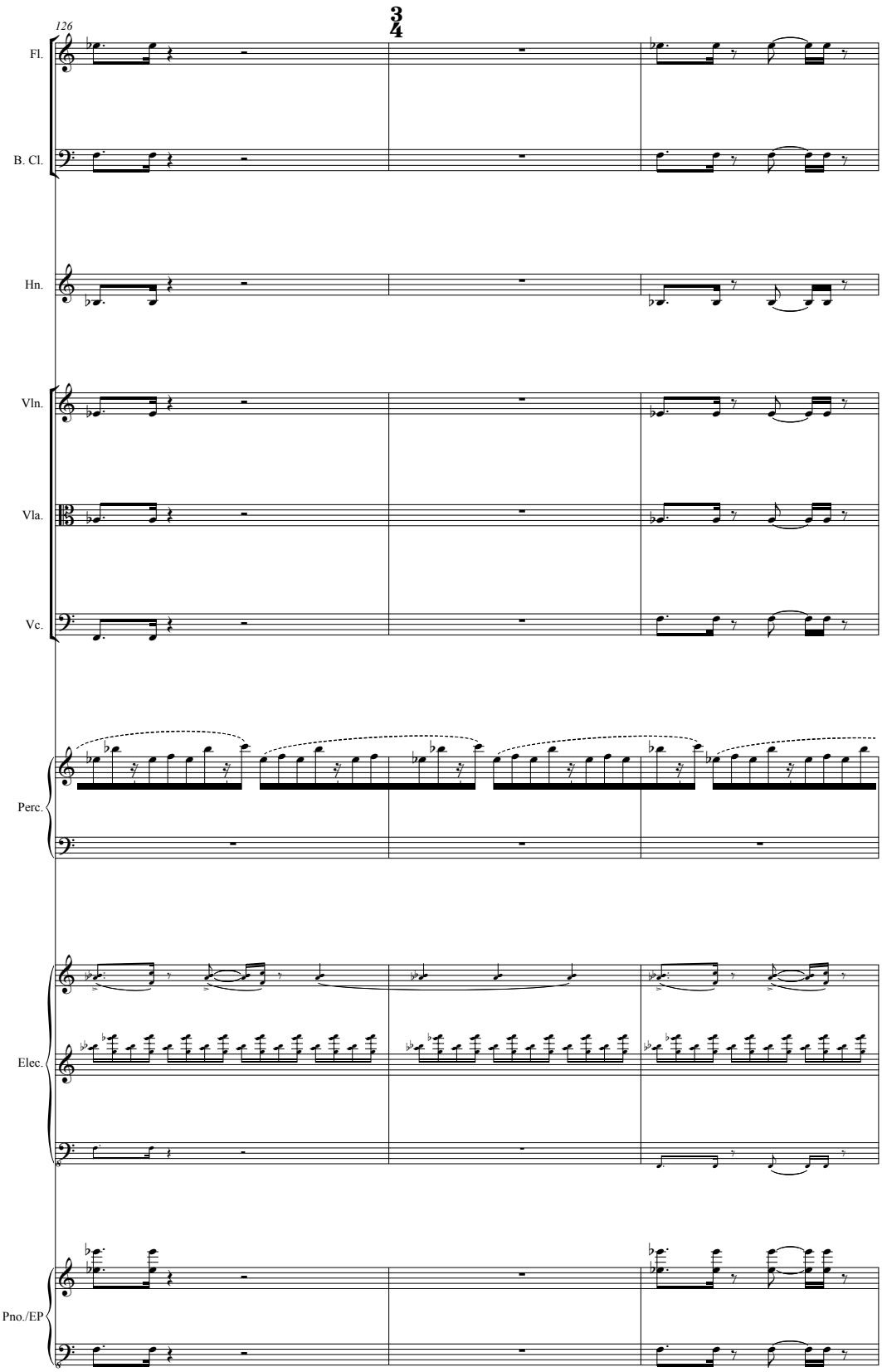

H
107
Fl.
B. Cl.
Hn.
(with Vc.)
Vln.
Vla.
Vc.
(with Hn.)
Perc.
Elec.
delayed signal
fades away
Pno./EP
loco
Ped.
Ped.

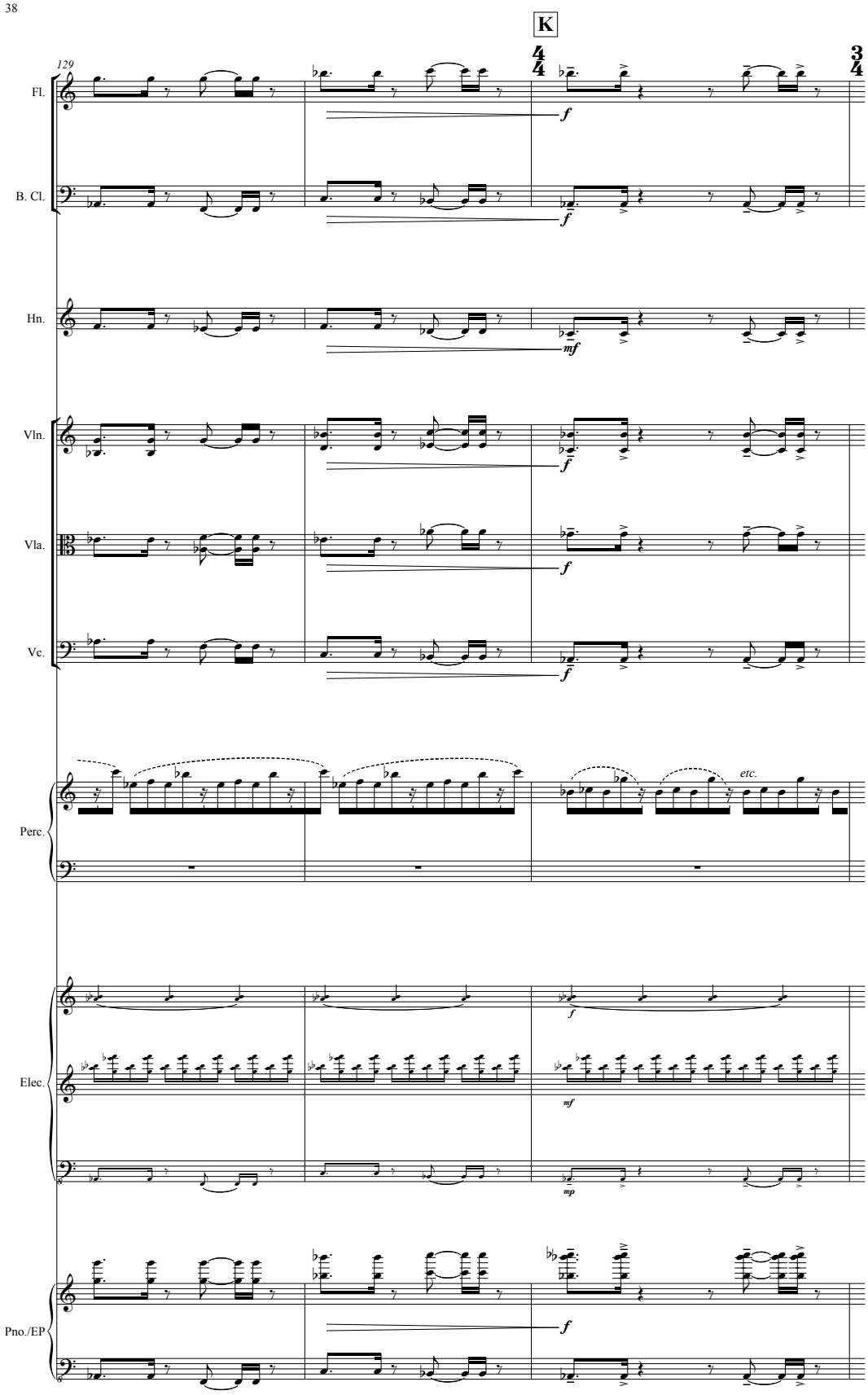

I
112
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
p sub.
p
3/4
4/4
3/4

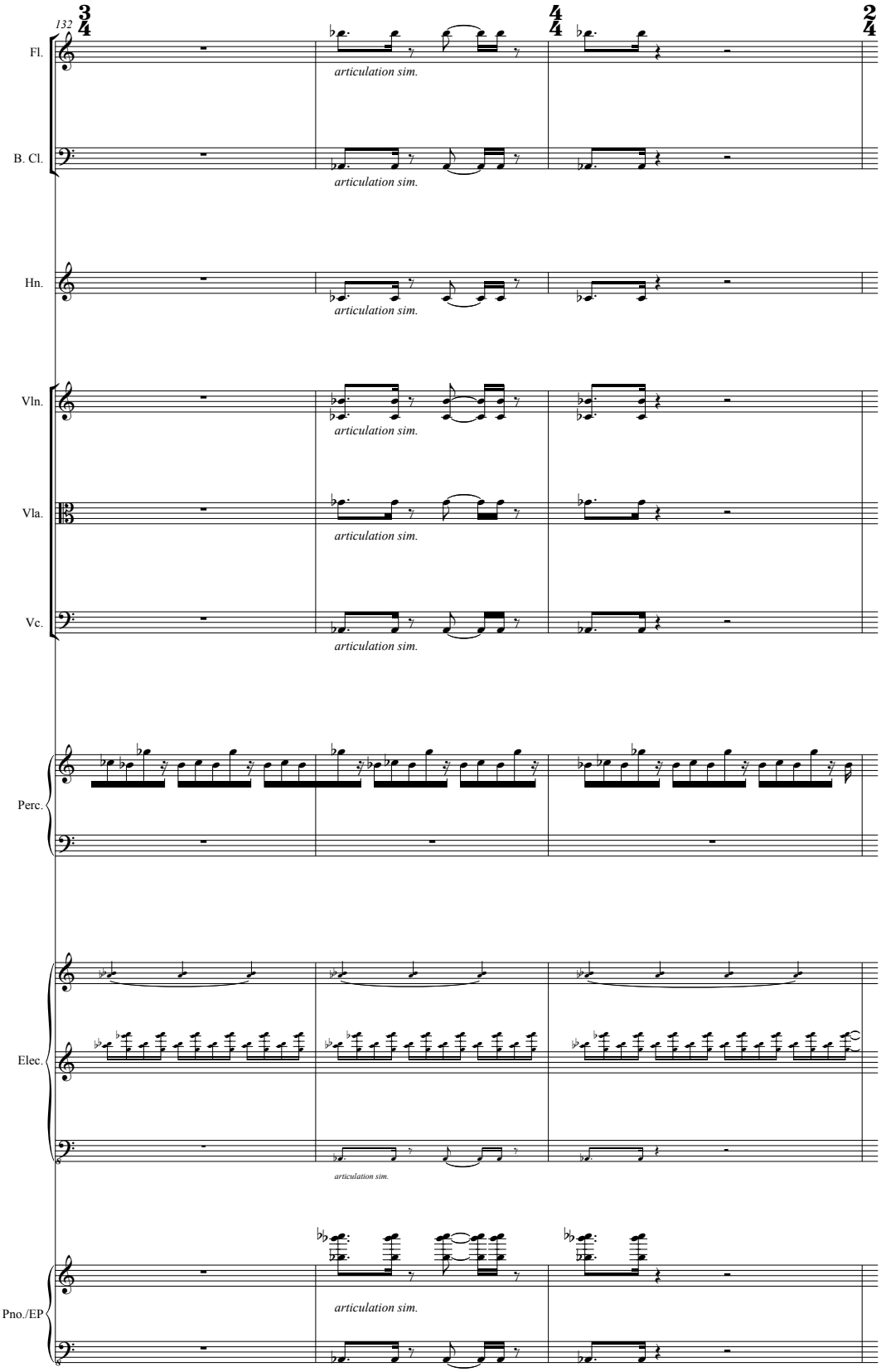

34
J
116
3
4
Fl.
B. Cl.
Hn.
Vln.
mf — (not too rough)
f
Vla.
mf
— (not too rough)
f
Vc.
mf — (not too rough)
f
Perc.
ff not accented, dashed slurs indicate phrasing
Elec.
ff
f
Pno./EP

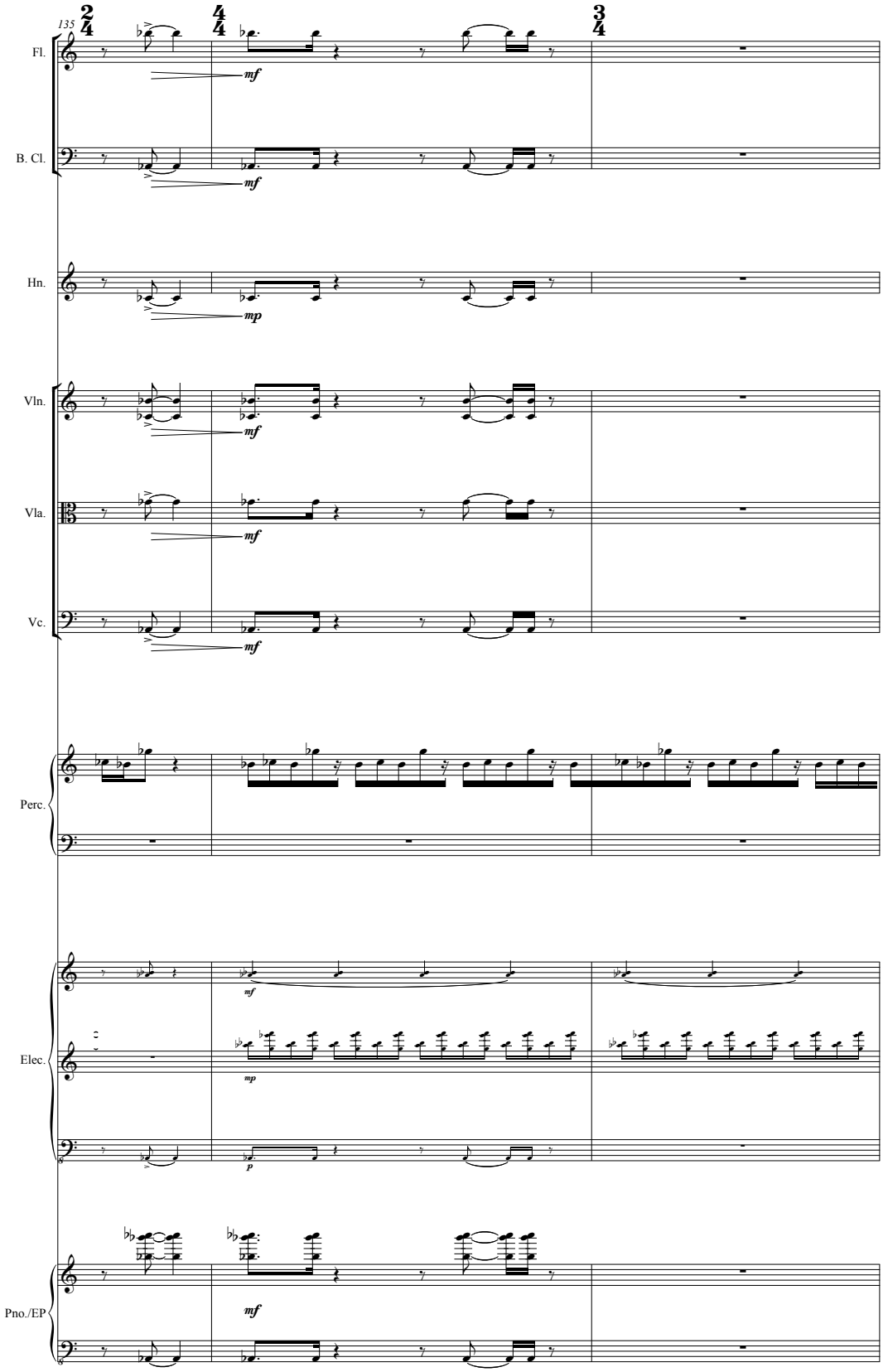

120
5
4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
ff
f
mf

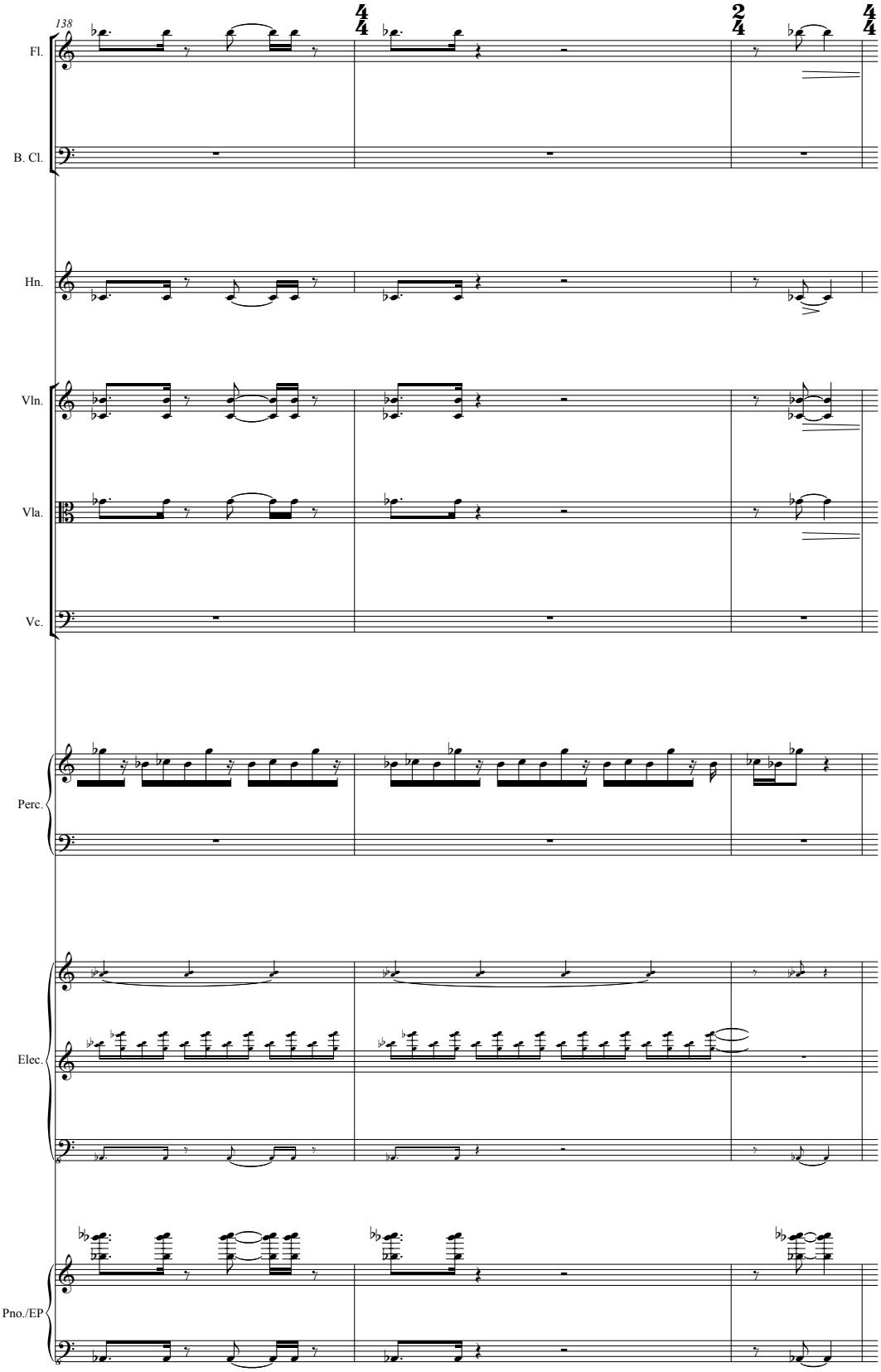

123
5/4
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

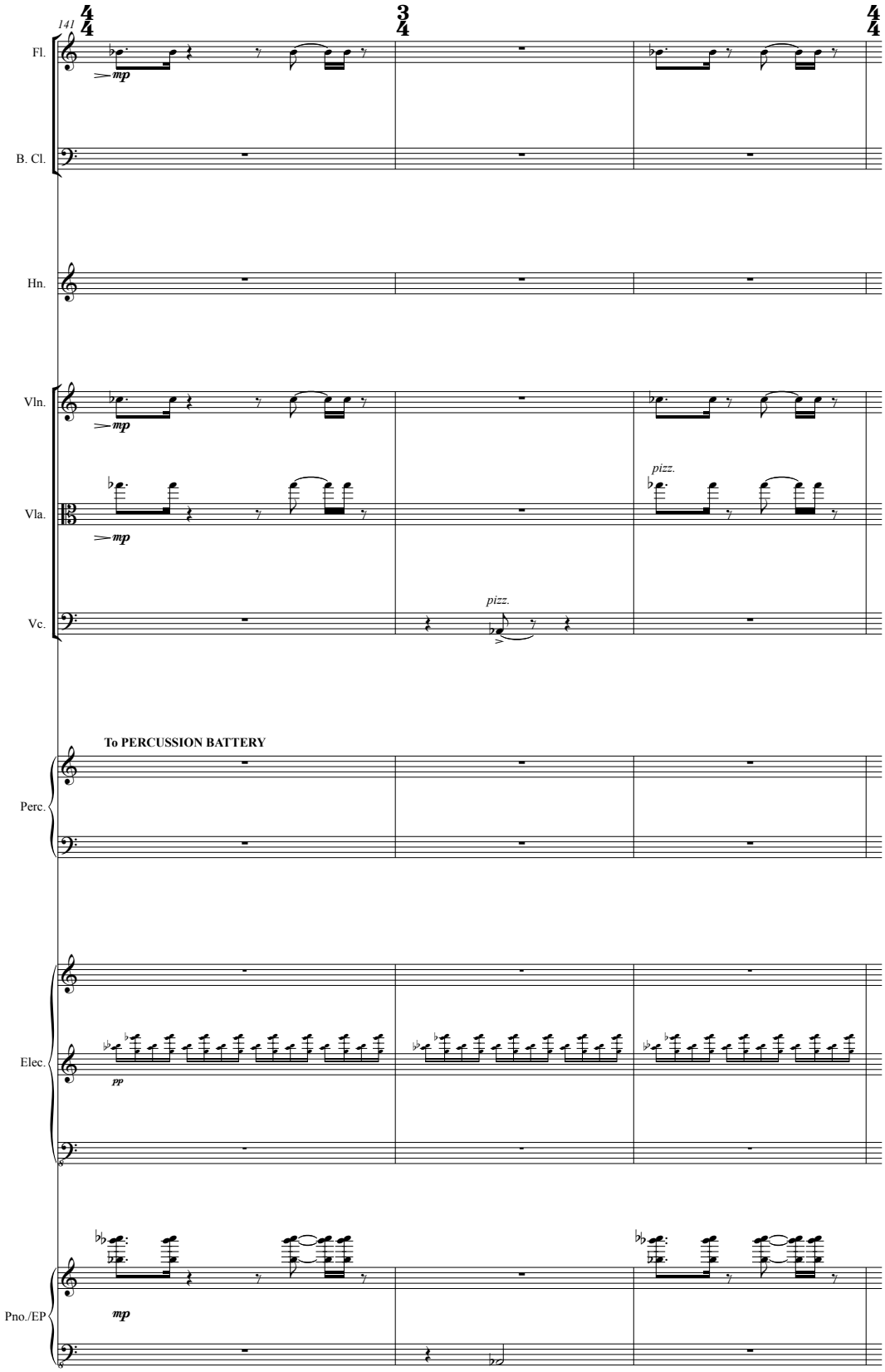

126
3
4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

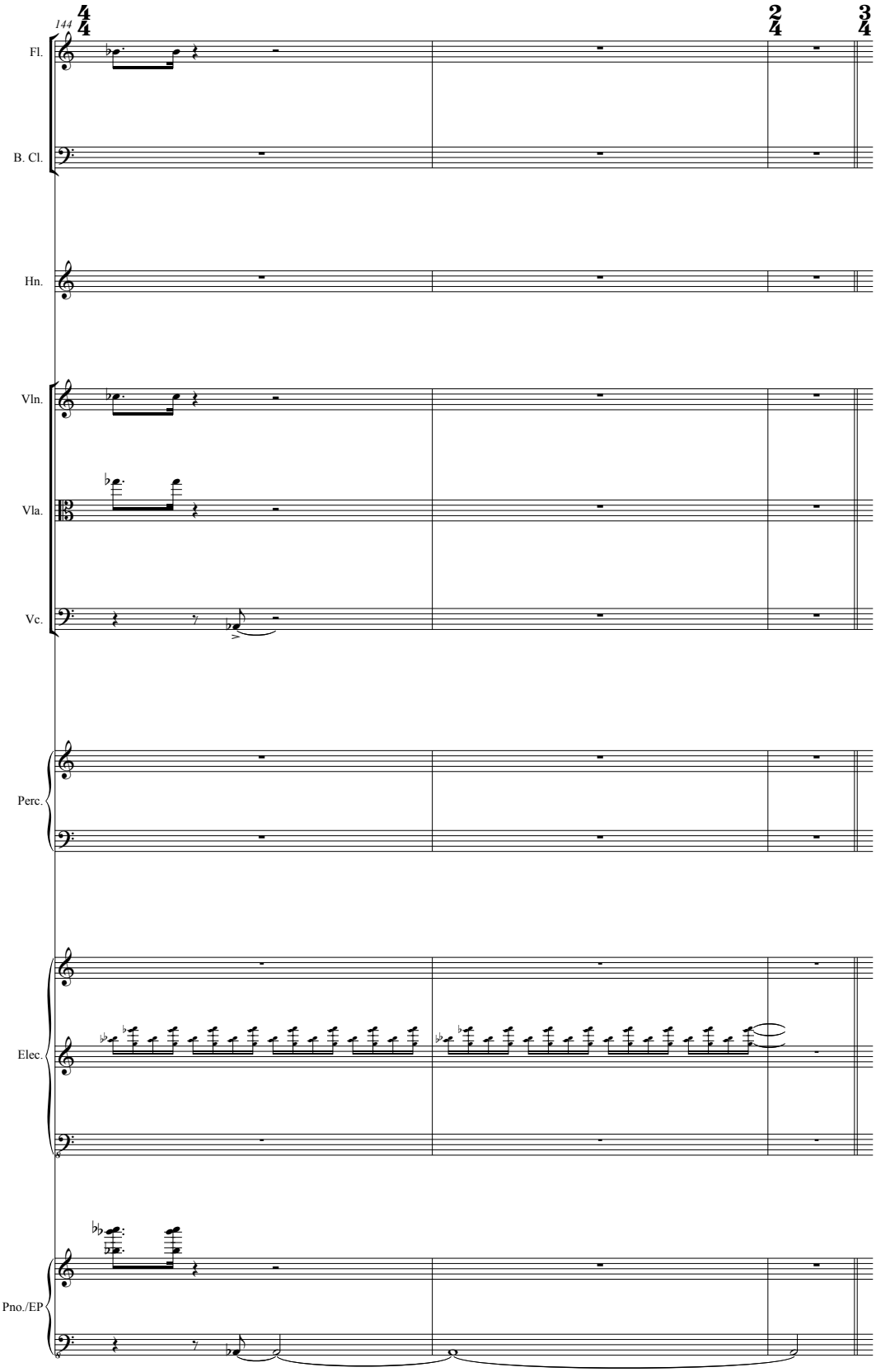

K
129
4/4
3/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
f
mf
mp
etc.


132
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
articulation sim.

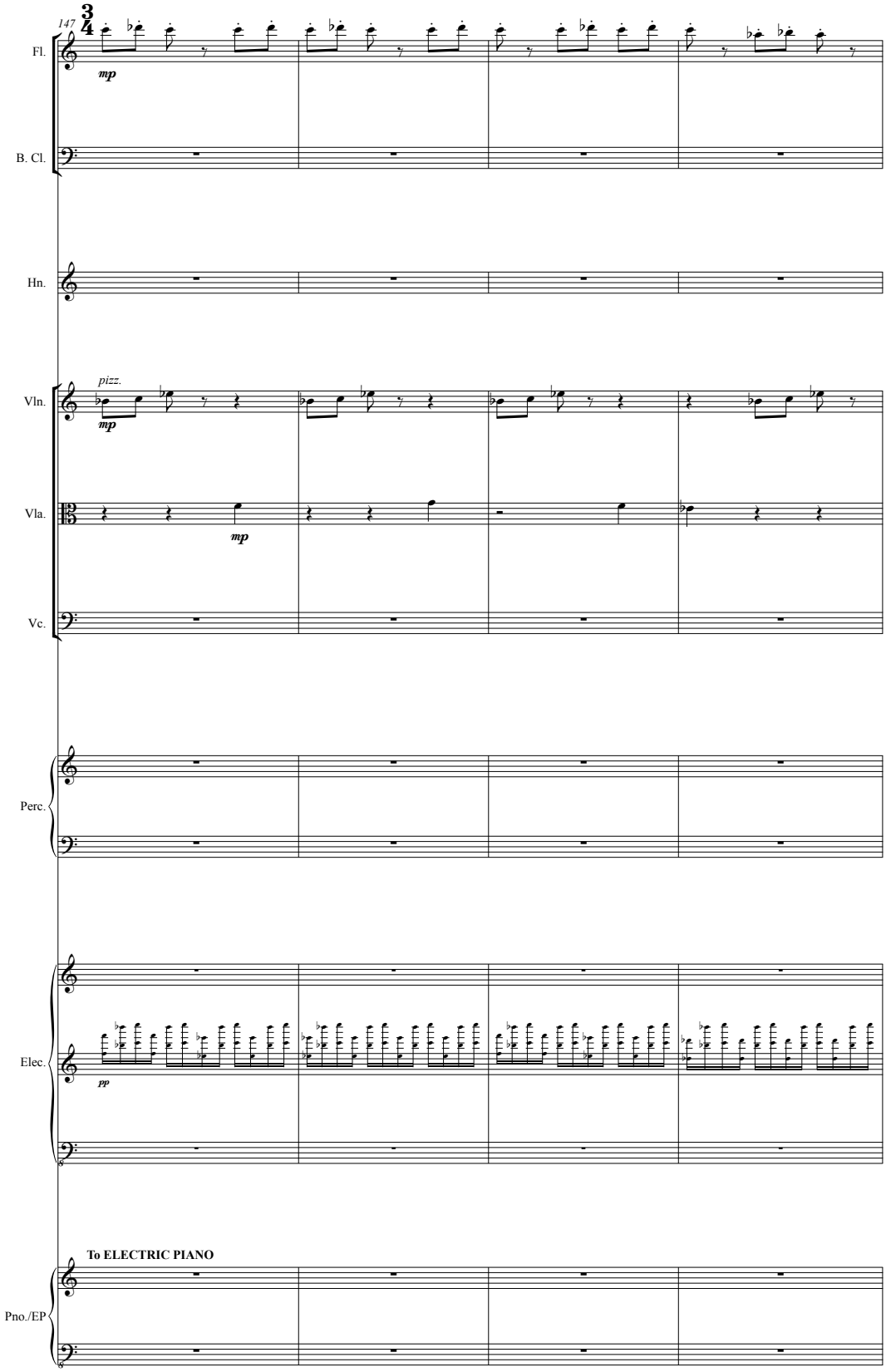

135
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
mf
mp
p

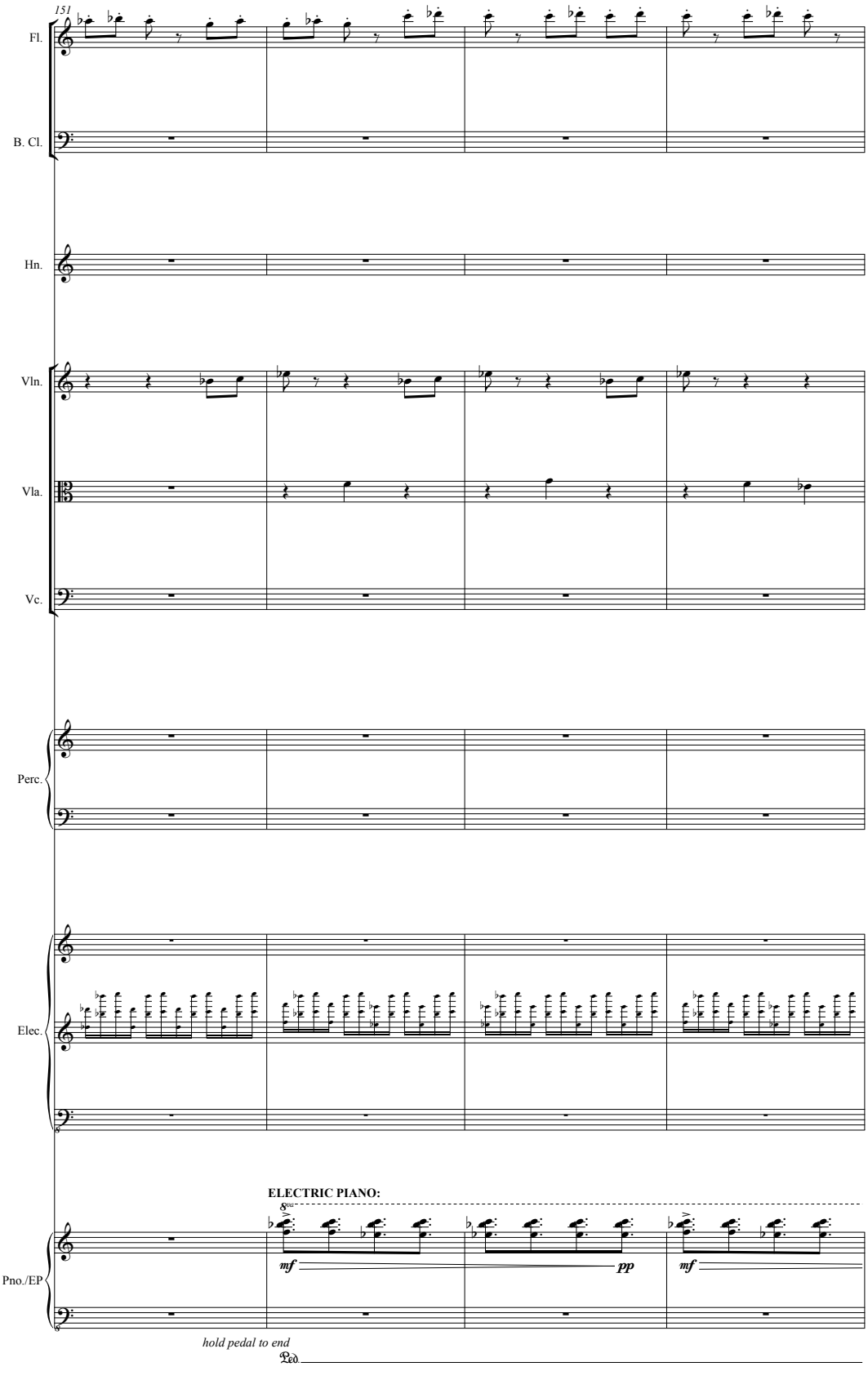

138
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

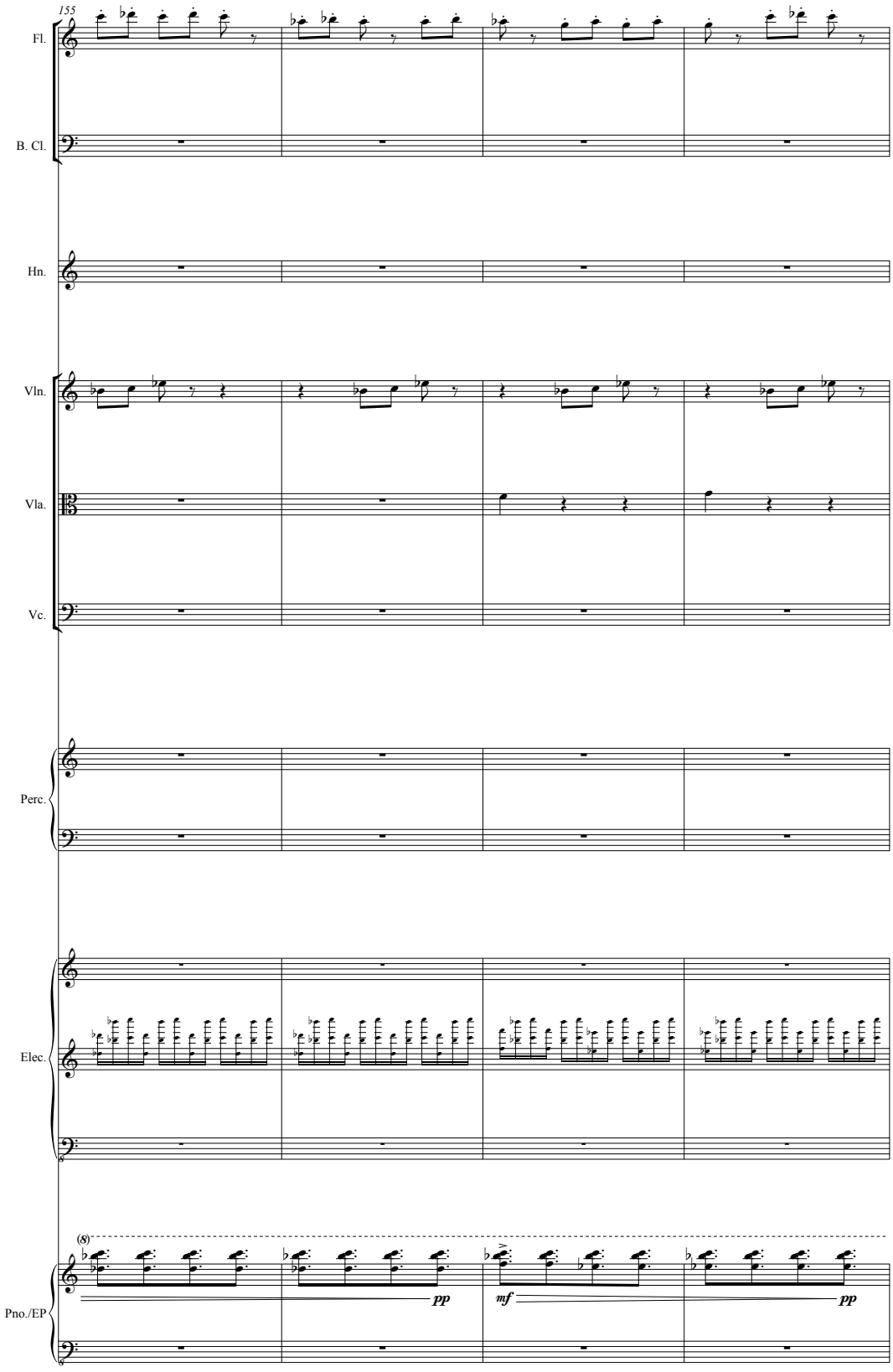

141
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
mp
pizz.
To PERCUSSION BATTERY
Perc.
Elec.
pp
Pno./EP


144
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

L **ABRUPTLY CALM AND PEACEFUL**




151
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
ELECTRIC PIANO:
Pno./EP
mf
pp
mf
hold pedal to end


155
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
(8)
pp
mf
pp
Pno./EP

M

159

Fl.

B. Cl.

Hn.

Vln.

Vla.

Vc.

mf *longingly, molto vibrato*

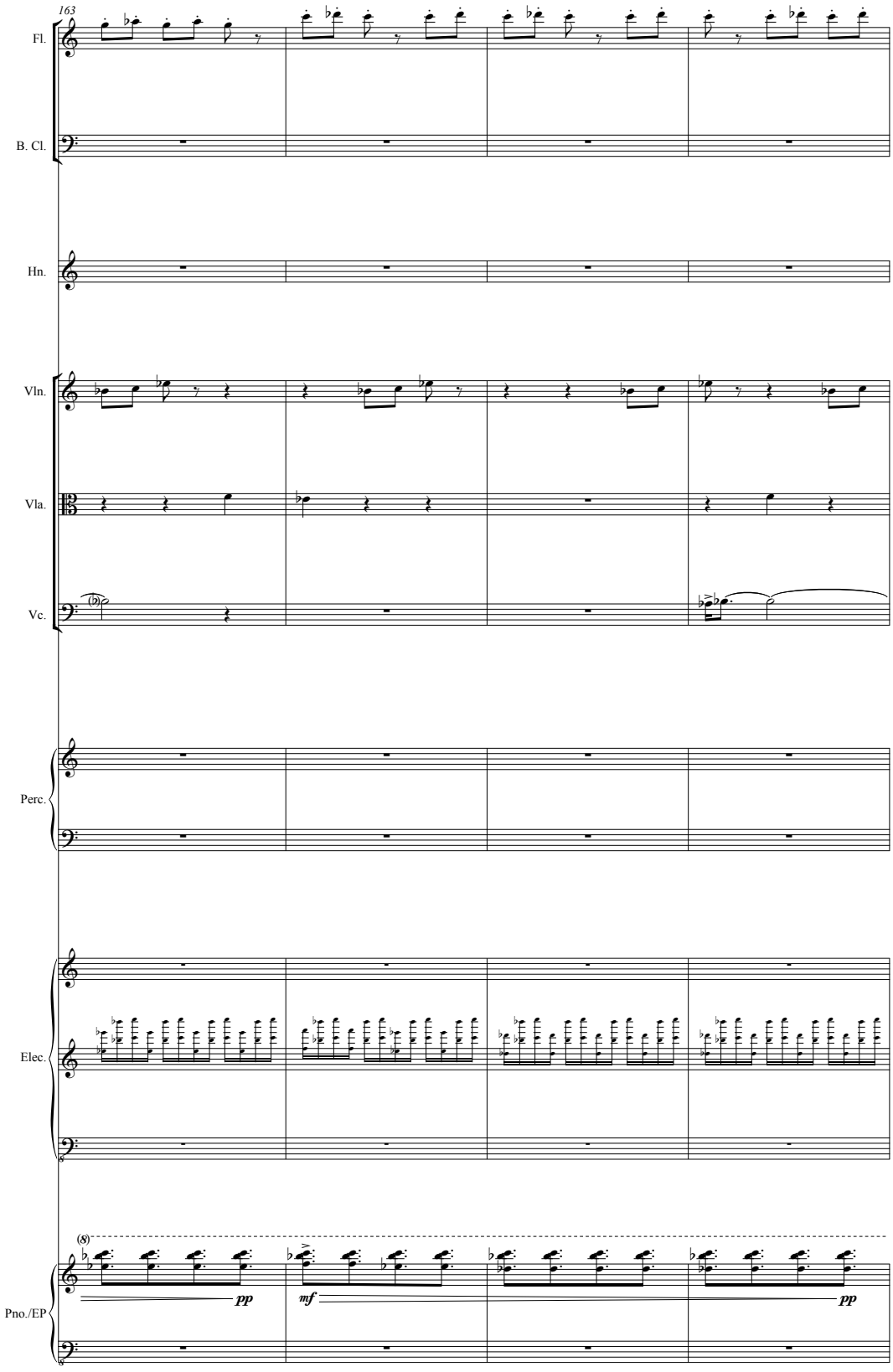
Perc.

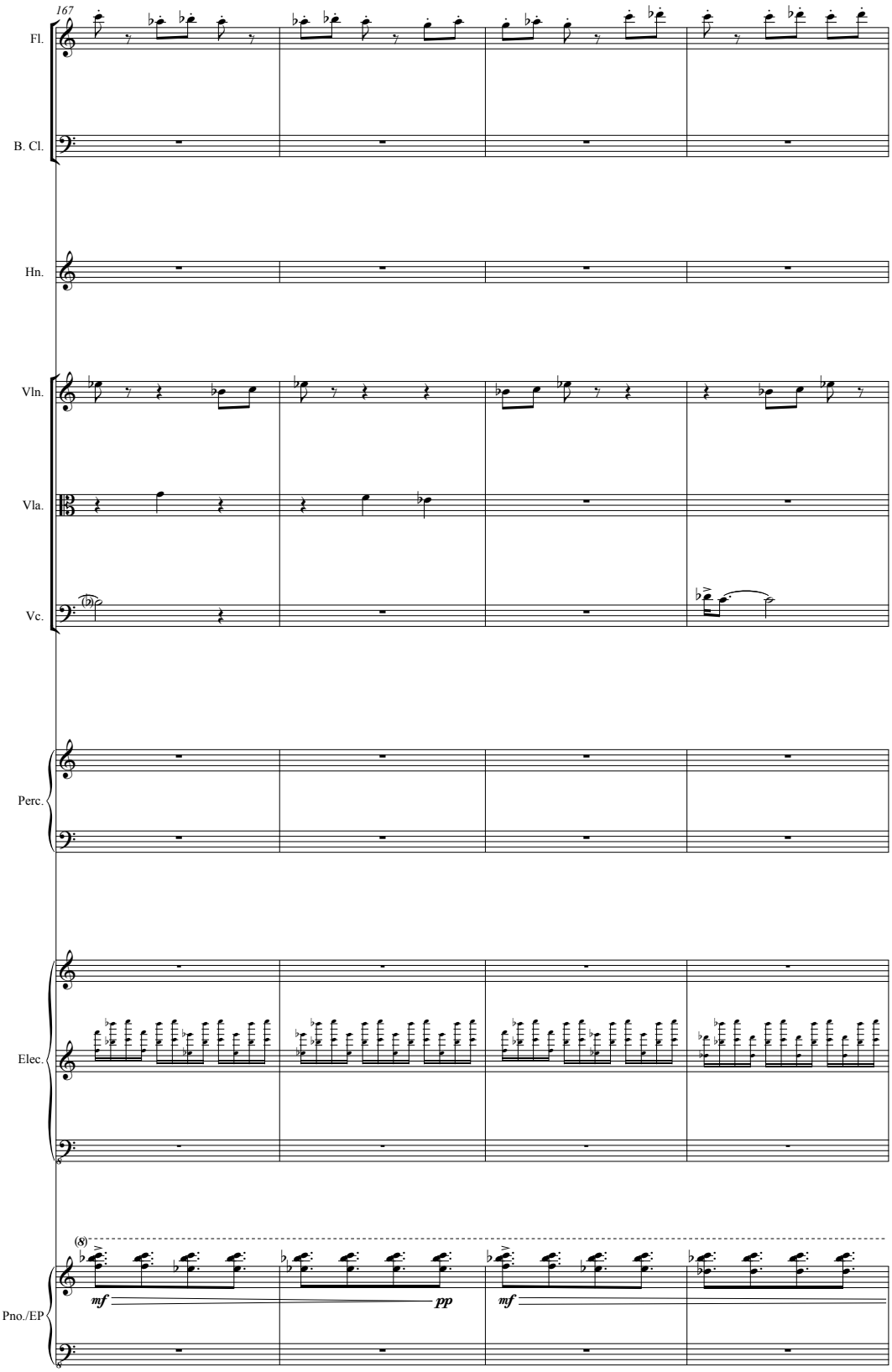
Elec.

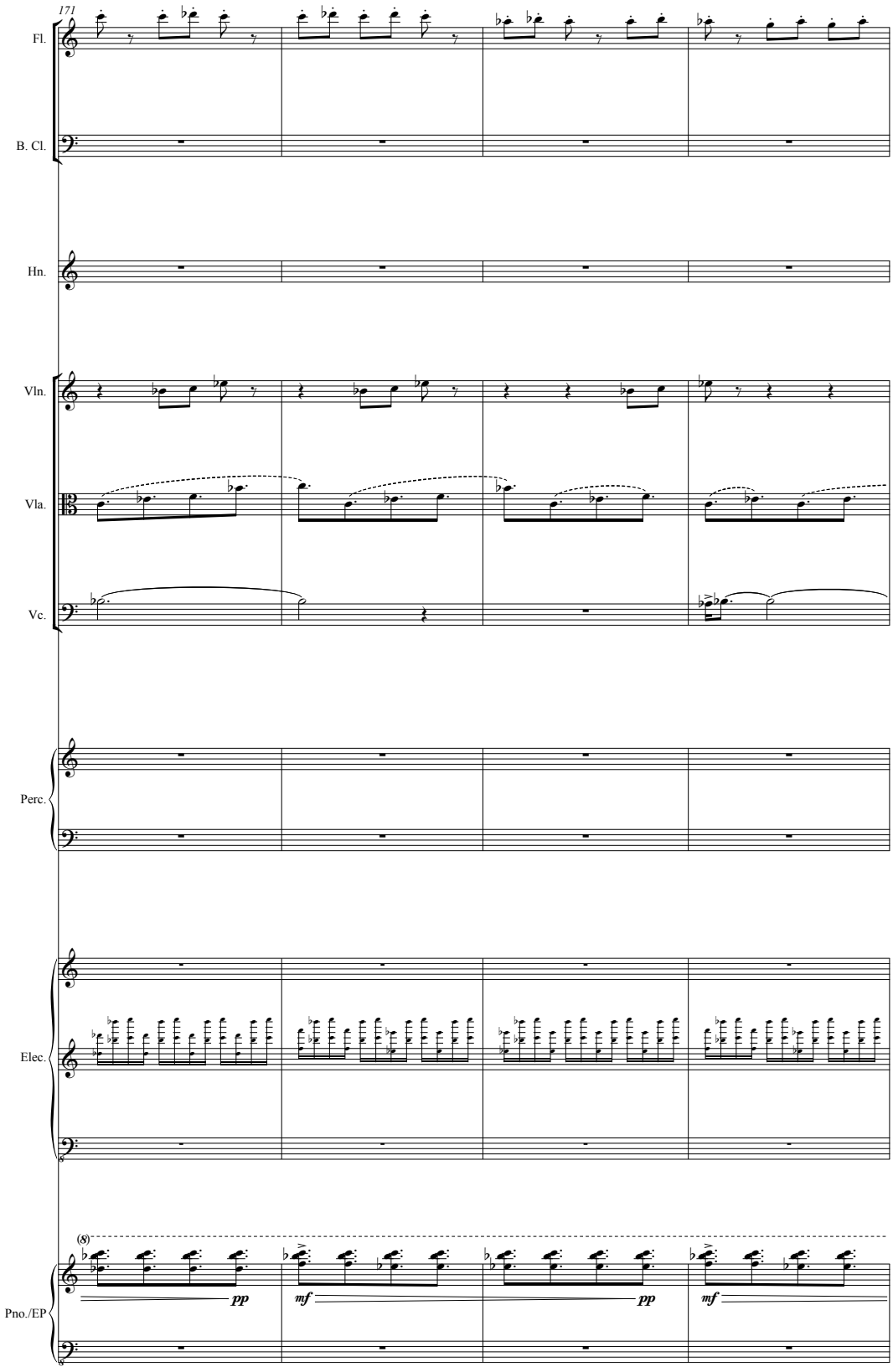
(8)

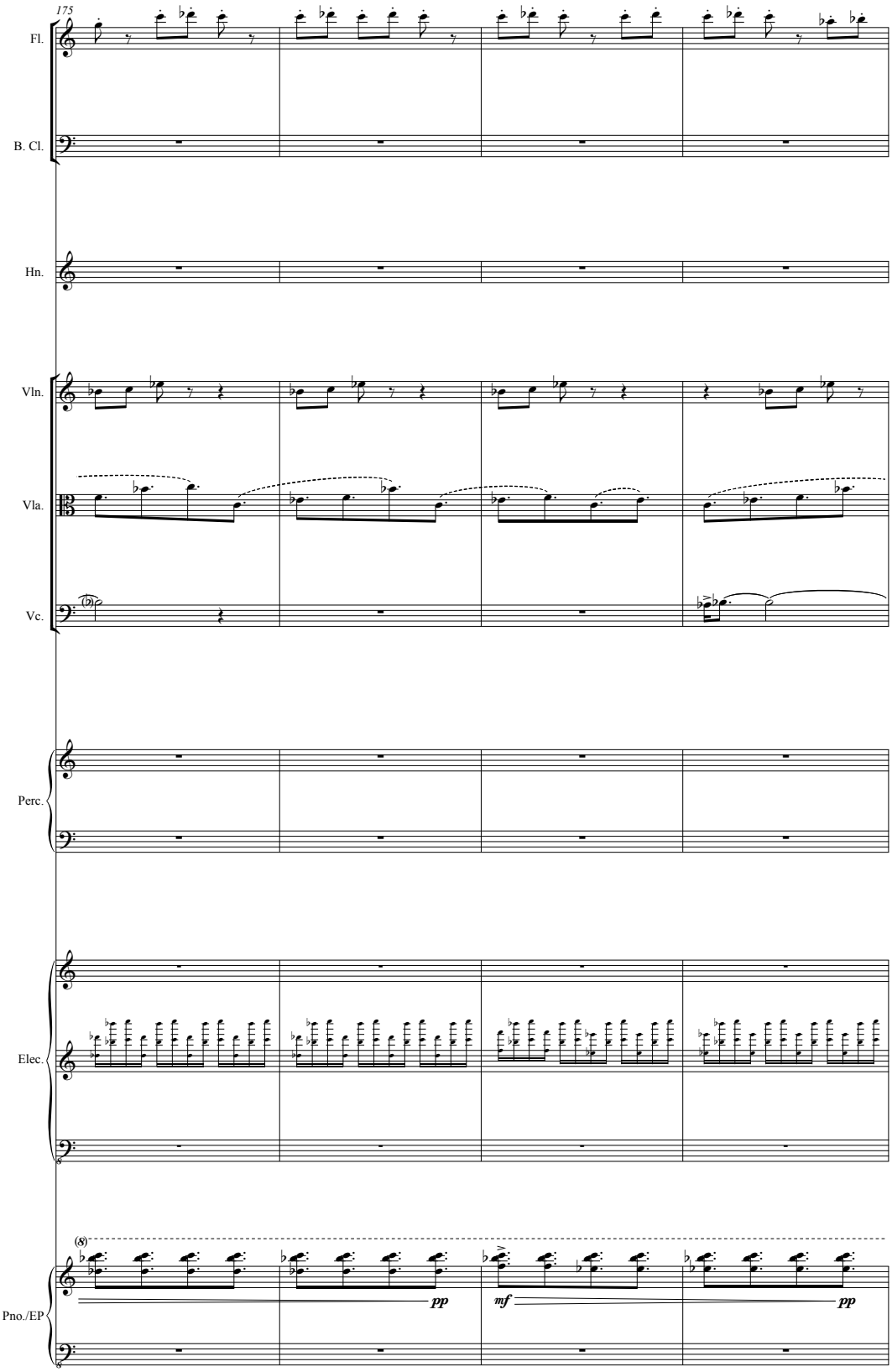
Pno./EP

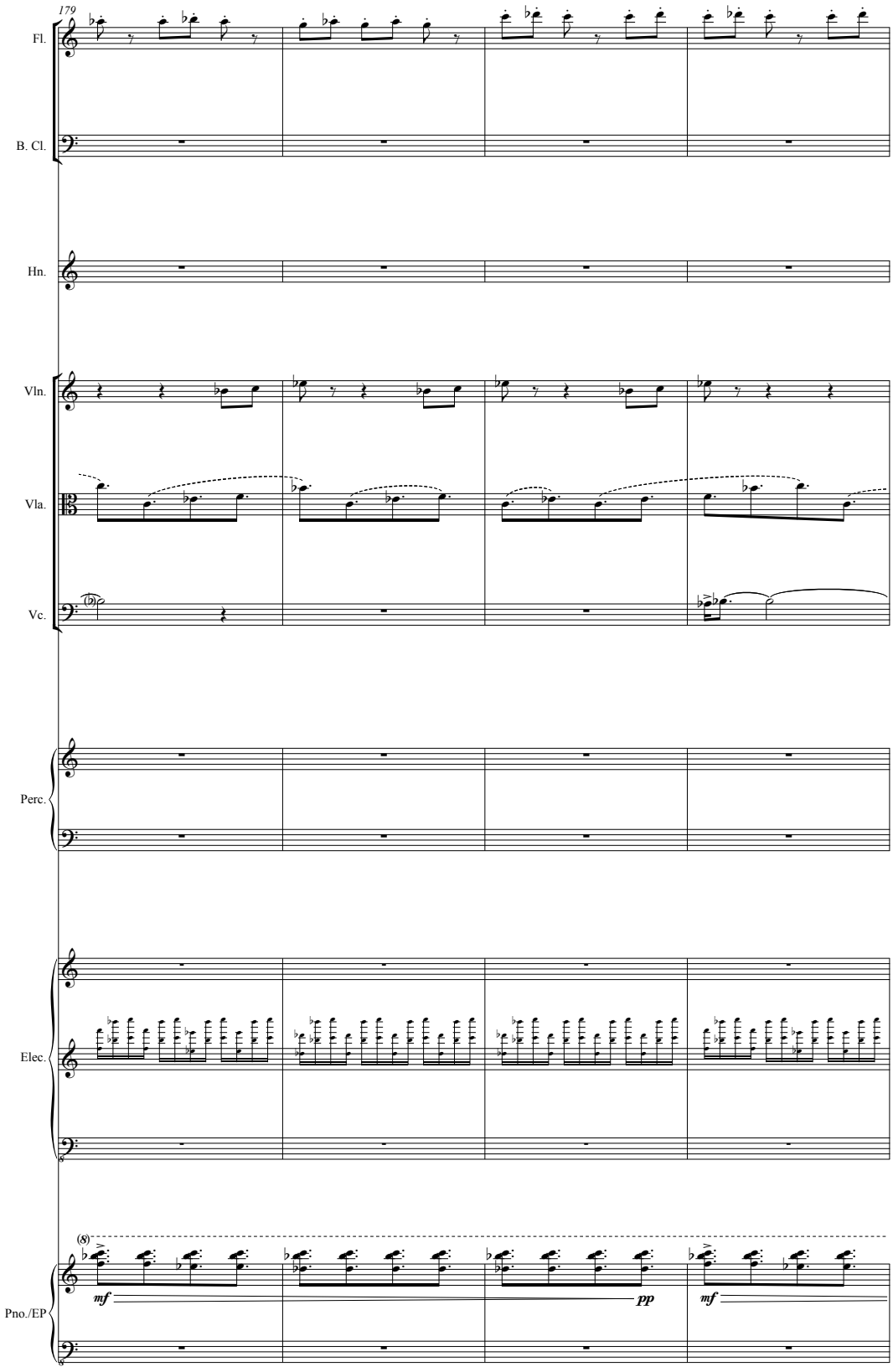
mf ***pp*** ***mf***

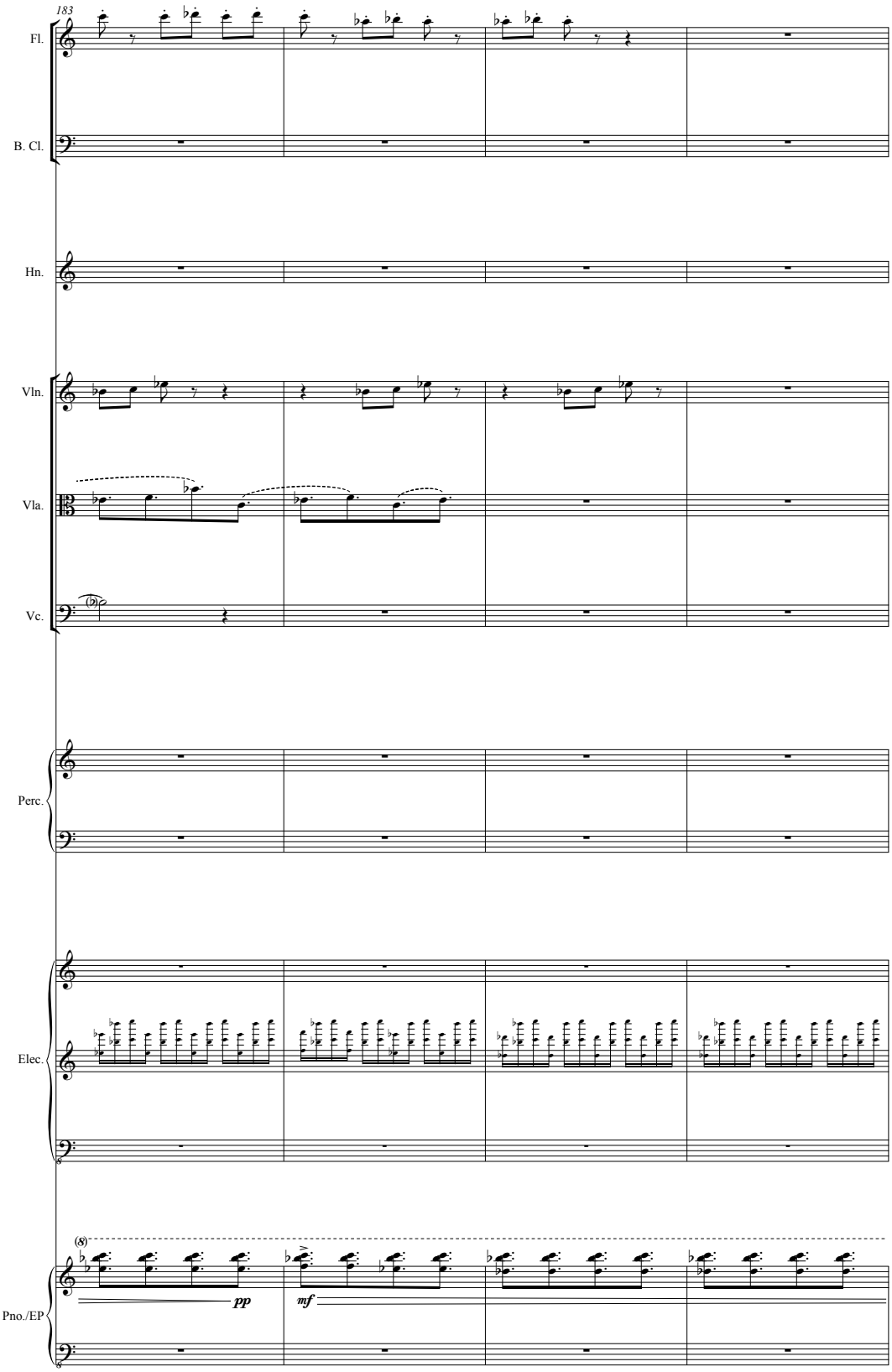

163
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
(8)
pp
mf
pp
Pno./EP

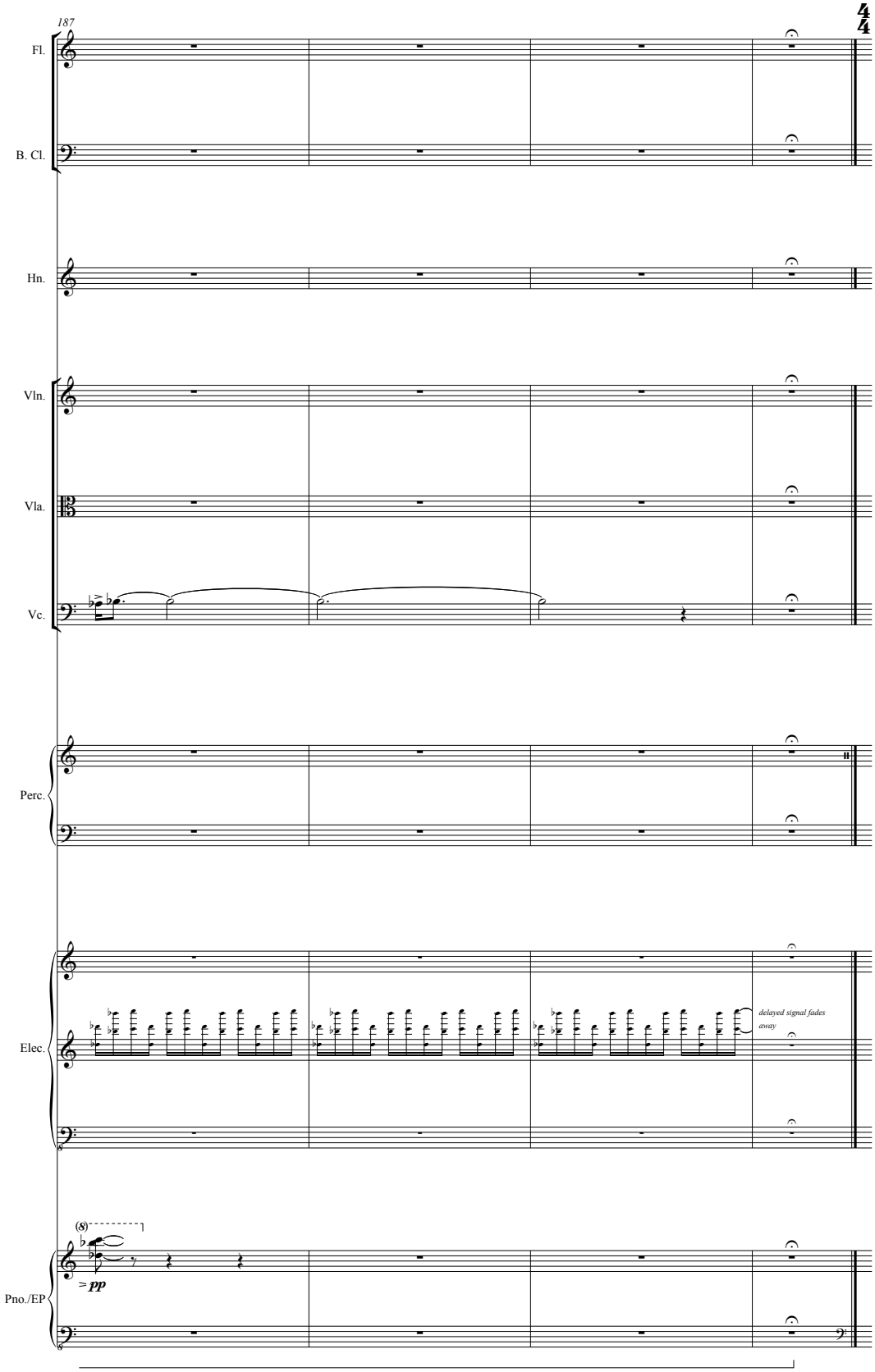

167
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
(8)
mf
pp
mf


171
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
(8)
pp
mf
pp
mf
Pno./EP


175
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
(8)
pp
mf
pp

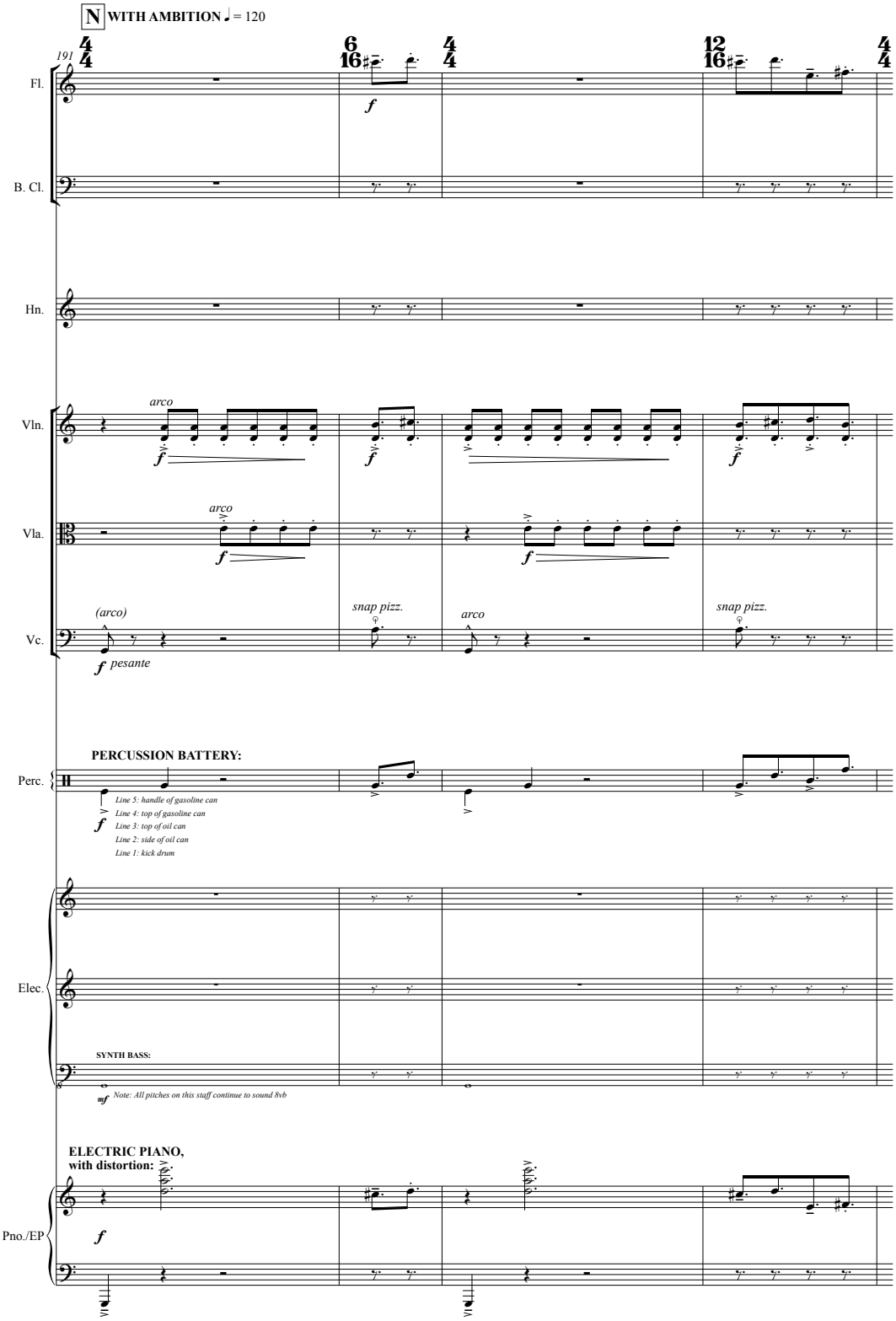

179
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
(8)
mf
pp
mf


183
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
(8)
pp
mf
Pno./EP

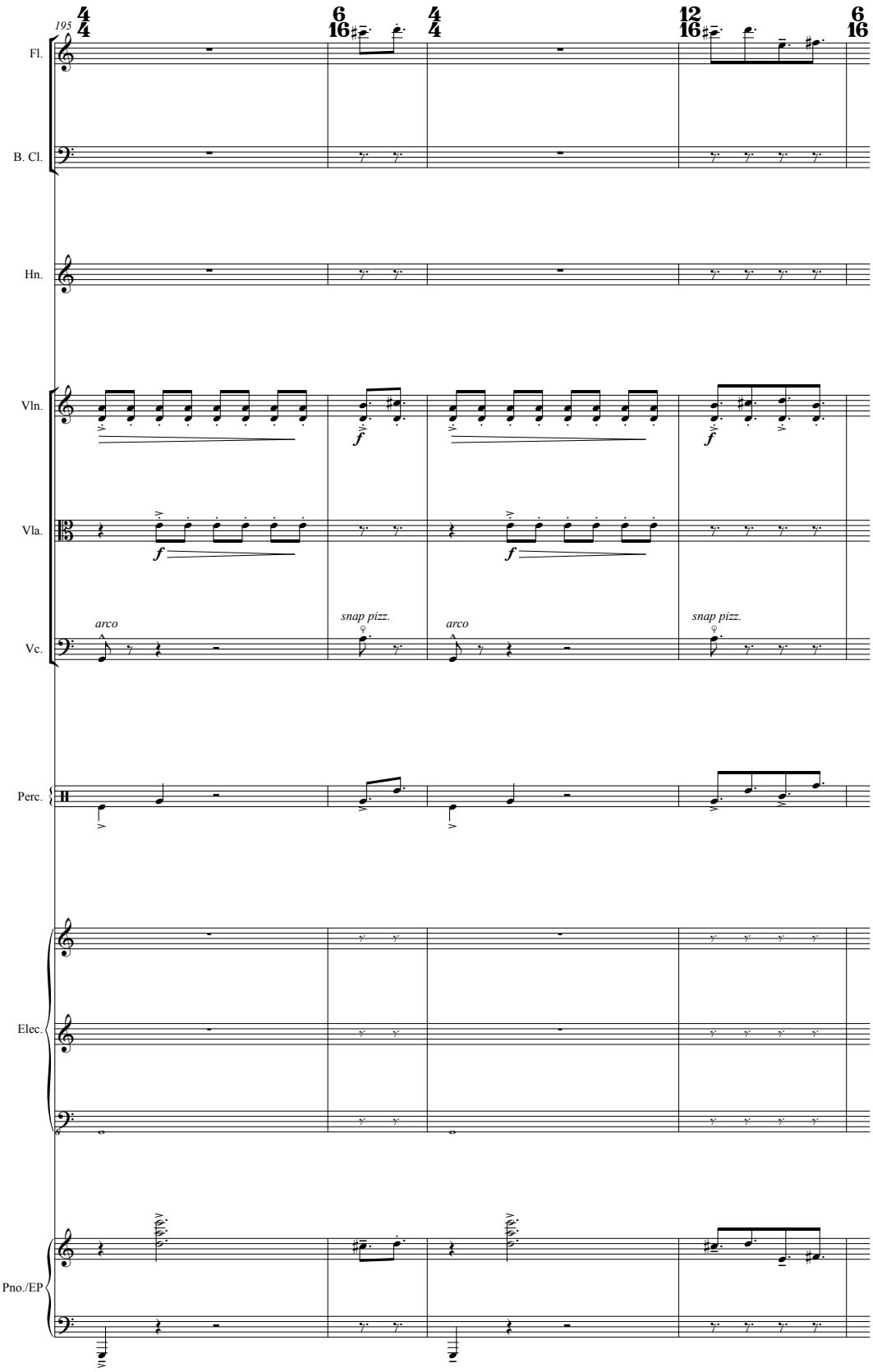

187
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
delayed signal fades away
Pno./EP
(8)
= pp

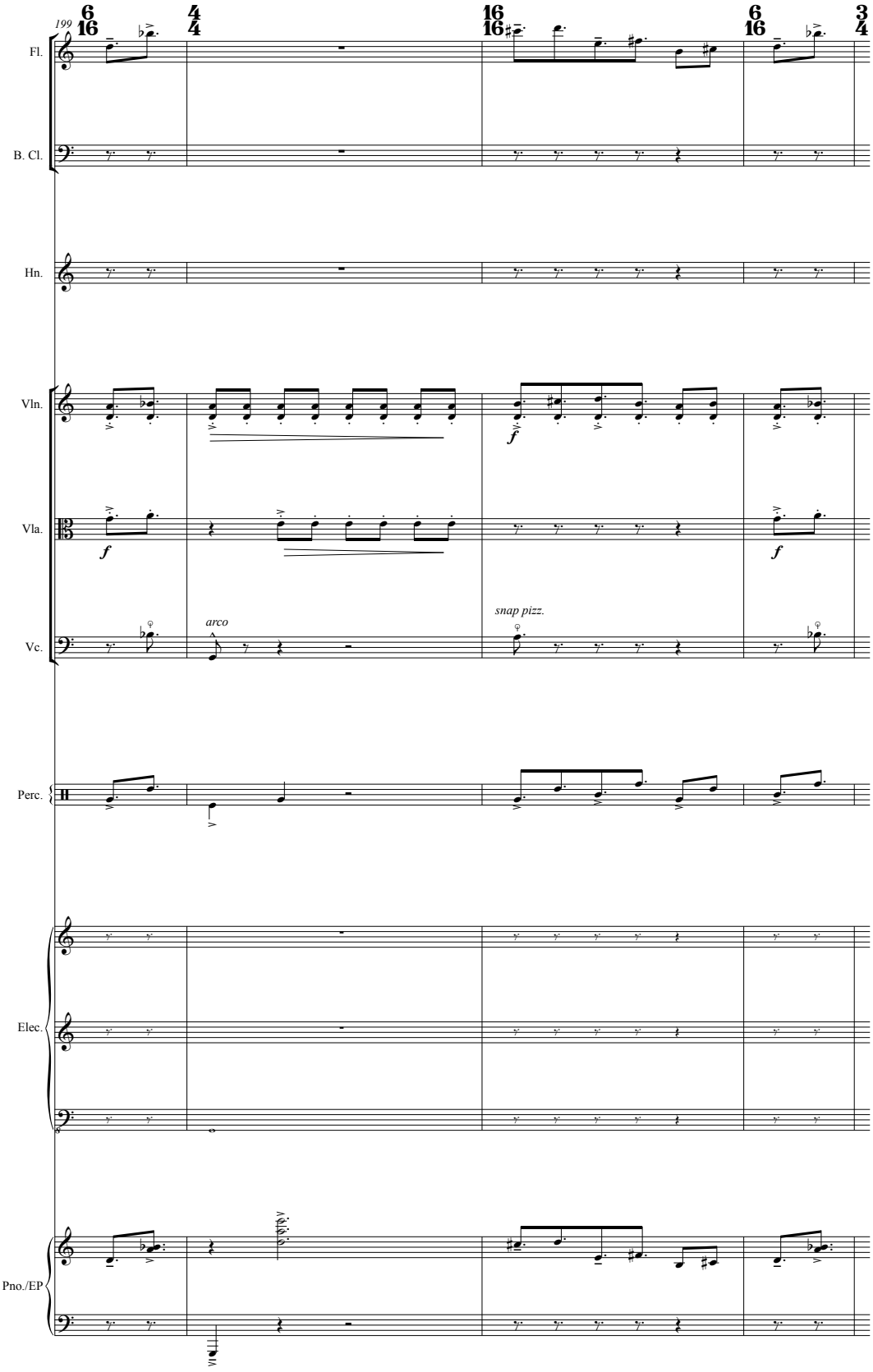
Cope

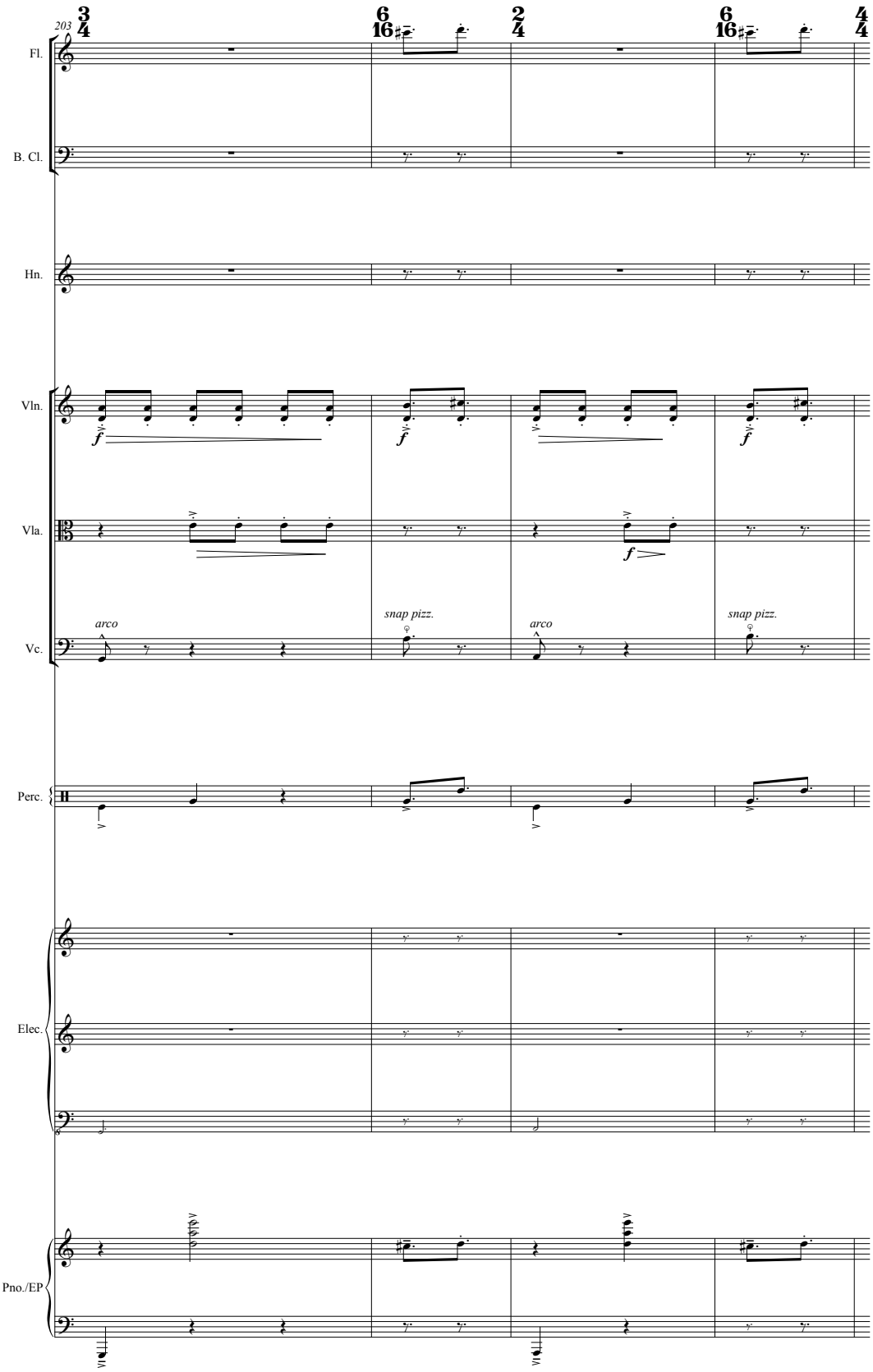
II.

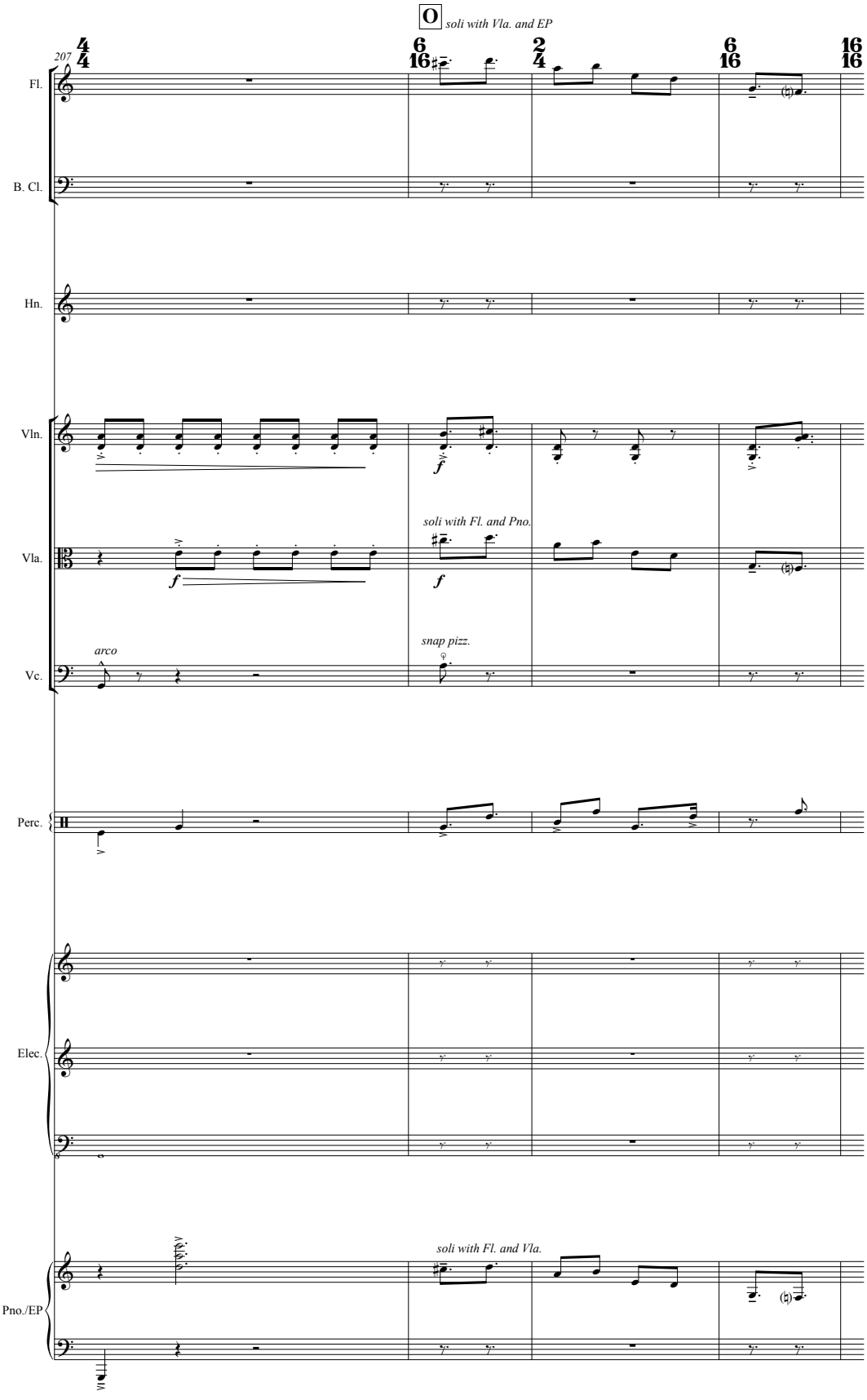


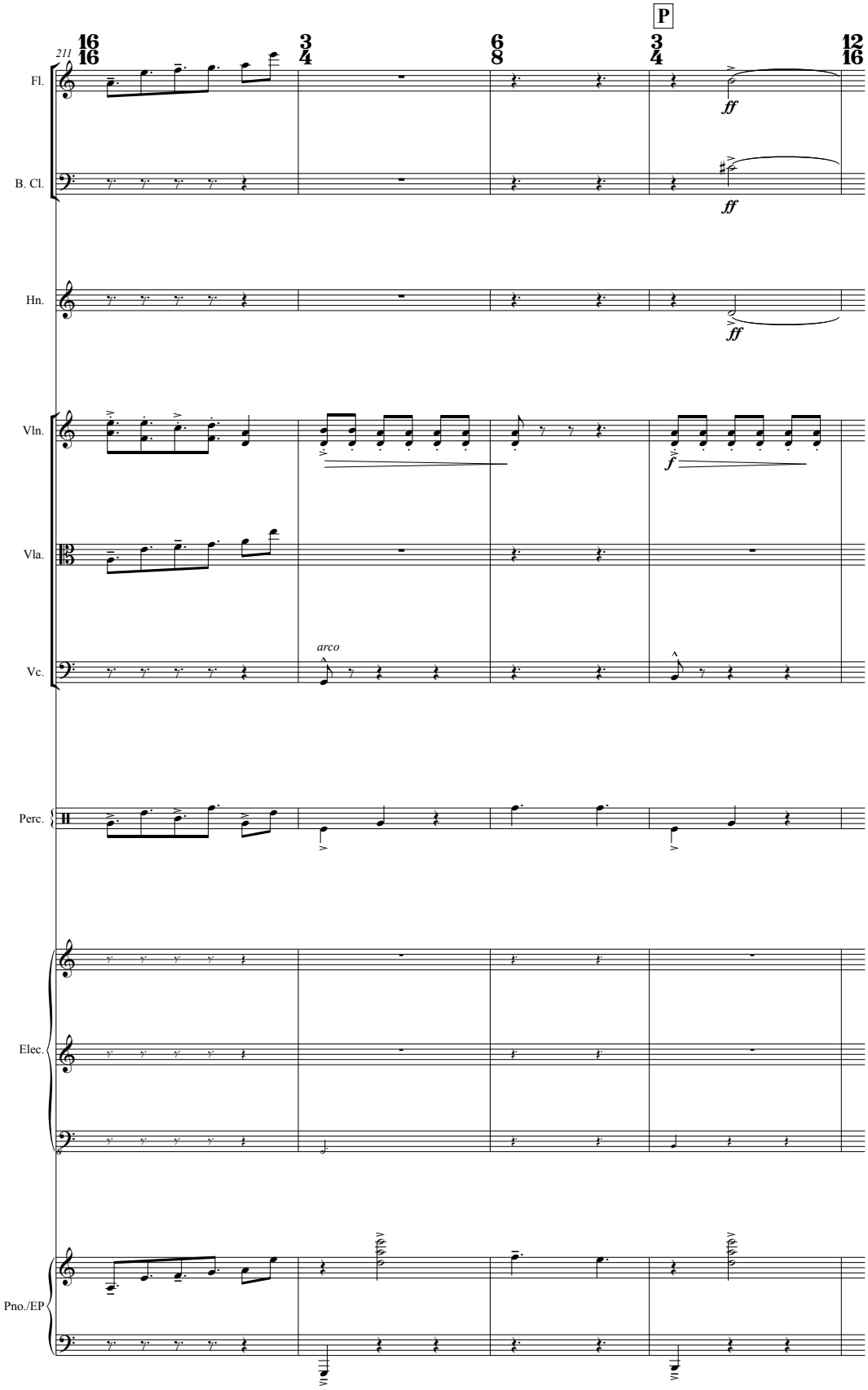
Note: All bass clef pitches sound at their normal octave (not 8vb as in Part 1)

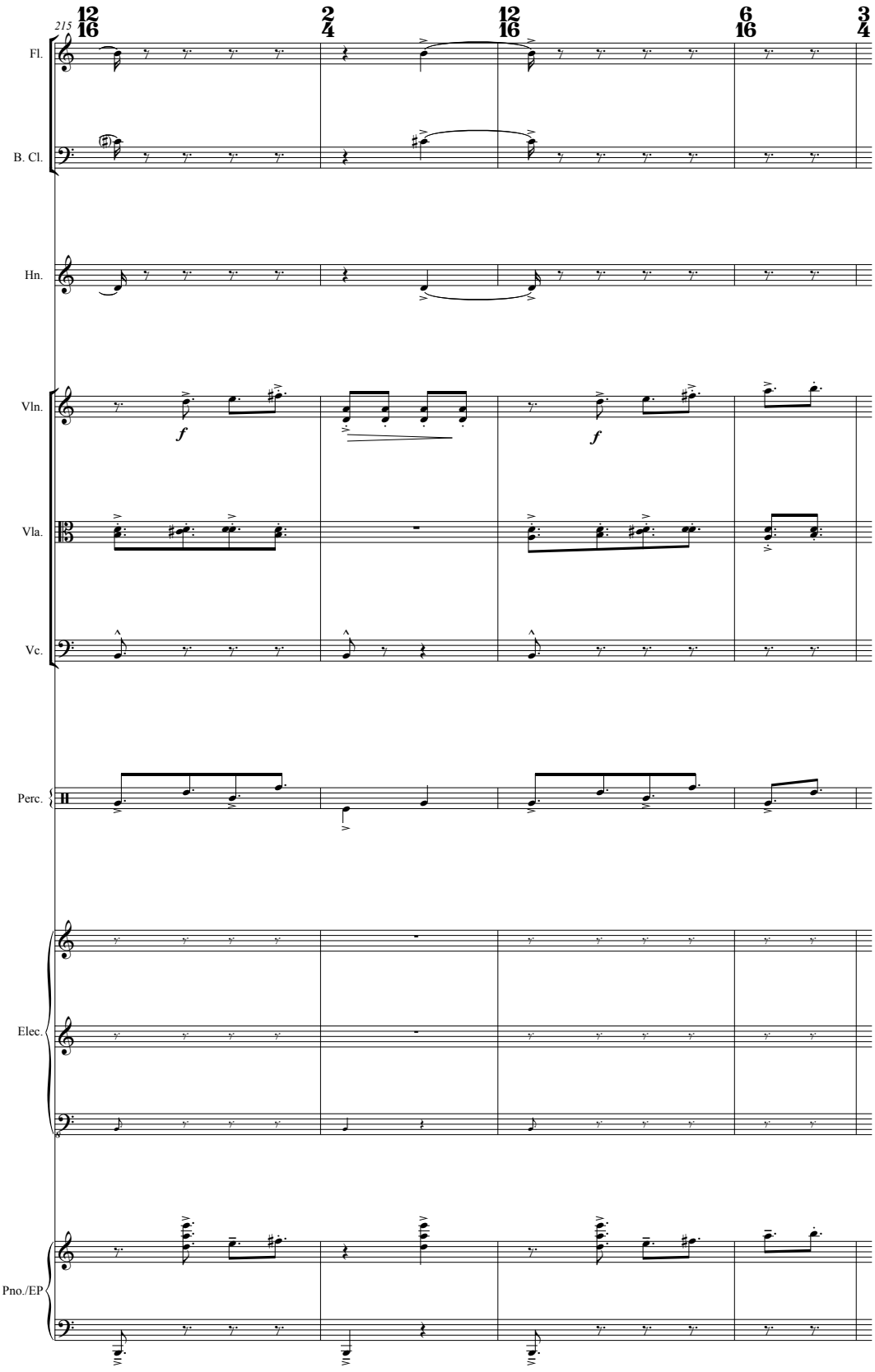

195
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
arco
snap pizz.
arco
snap pizz.

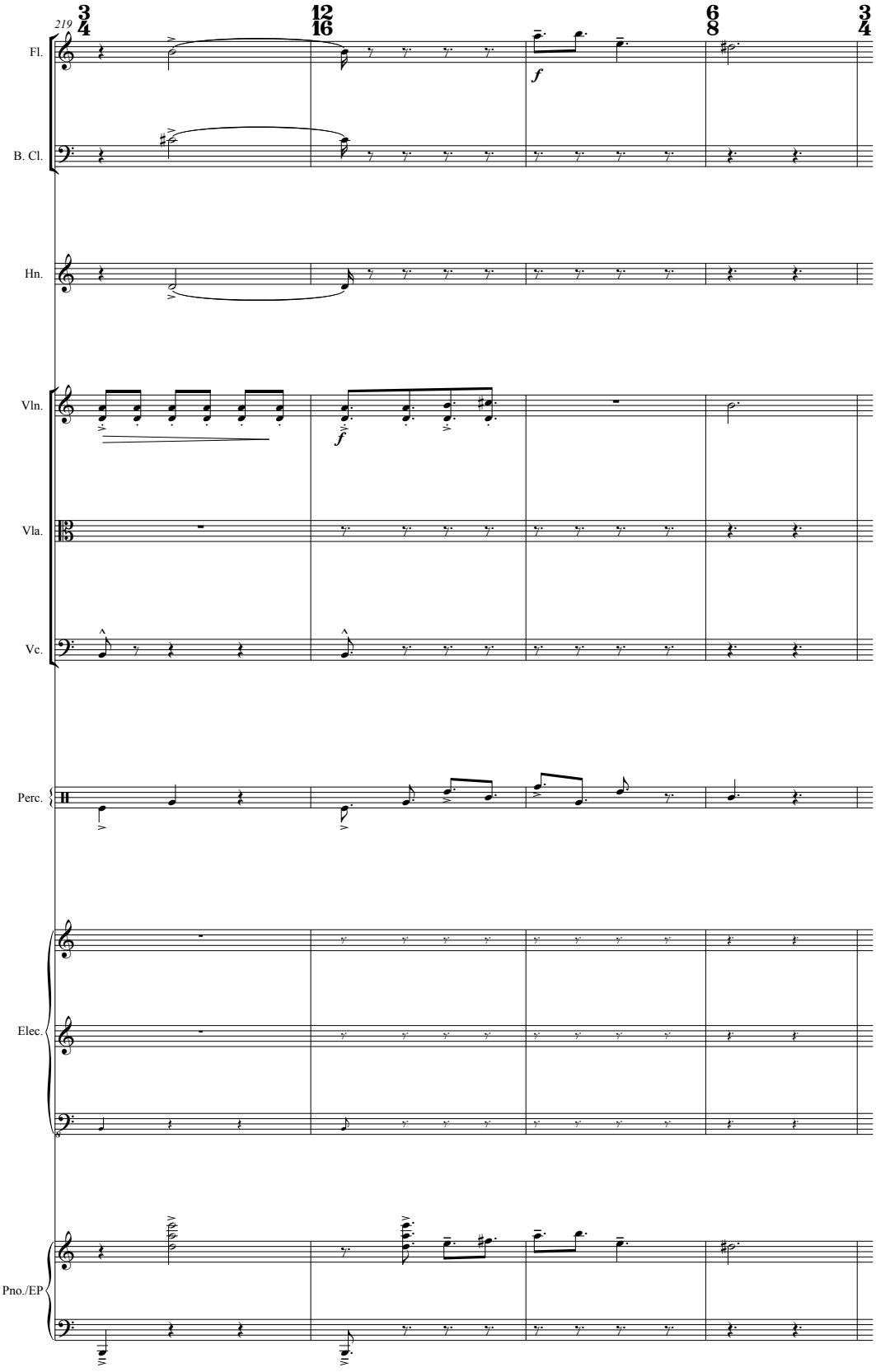

199
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
f
arco
snap pizz.

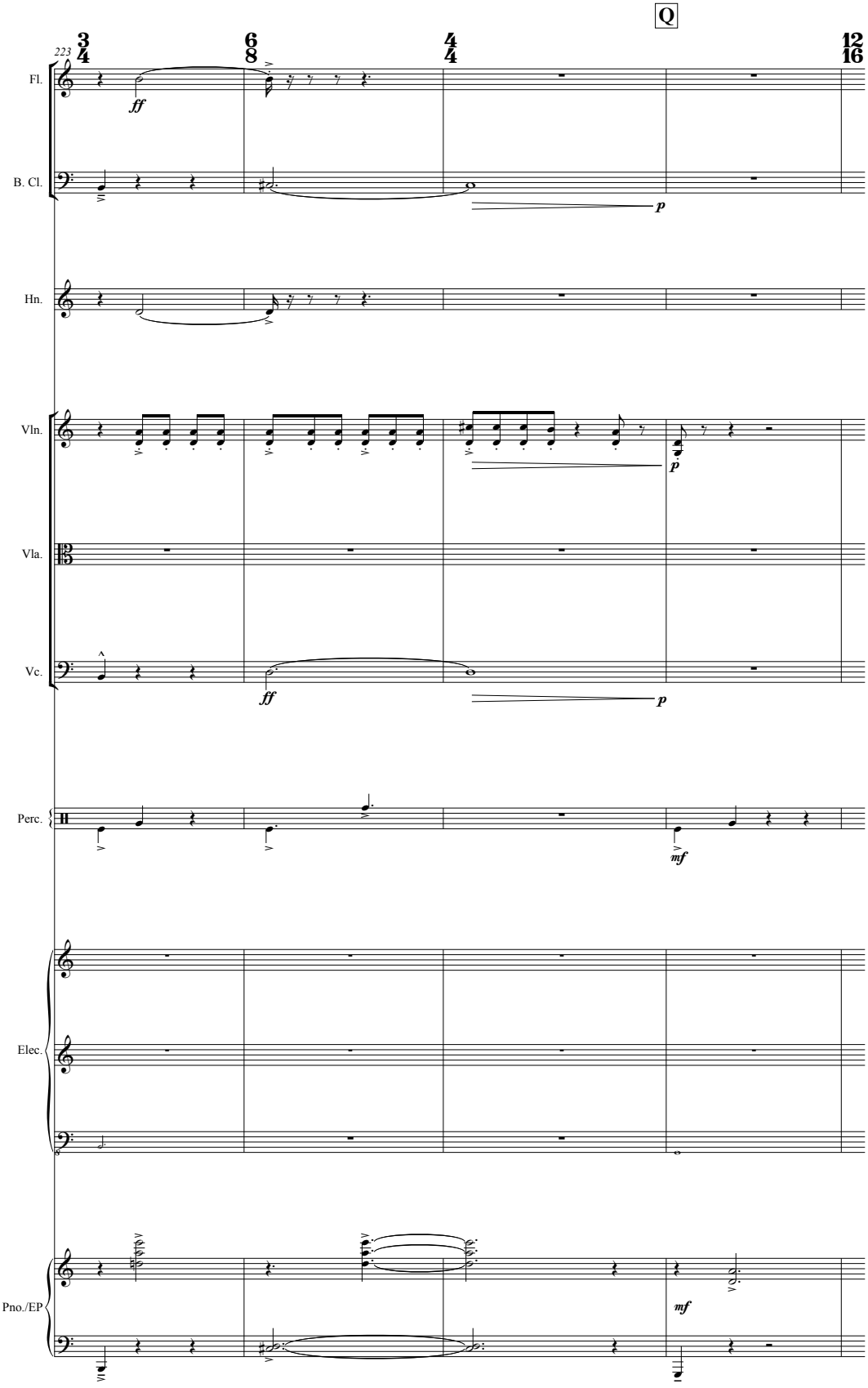

203
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
arco
snap pizz.
arco
snap pizz.

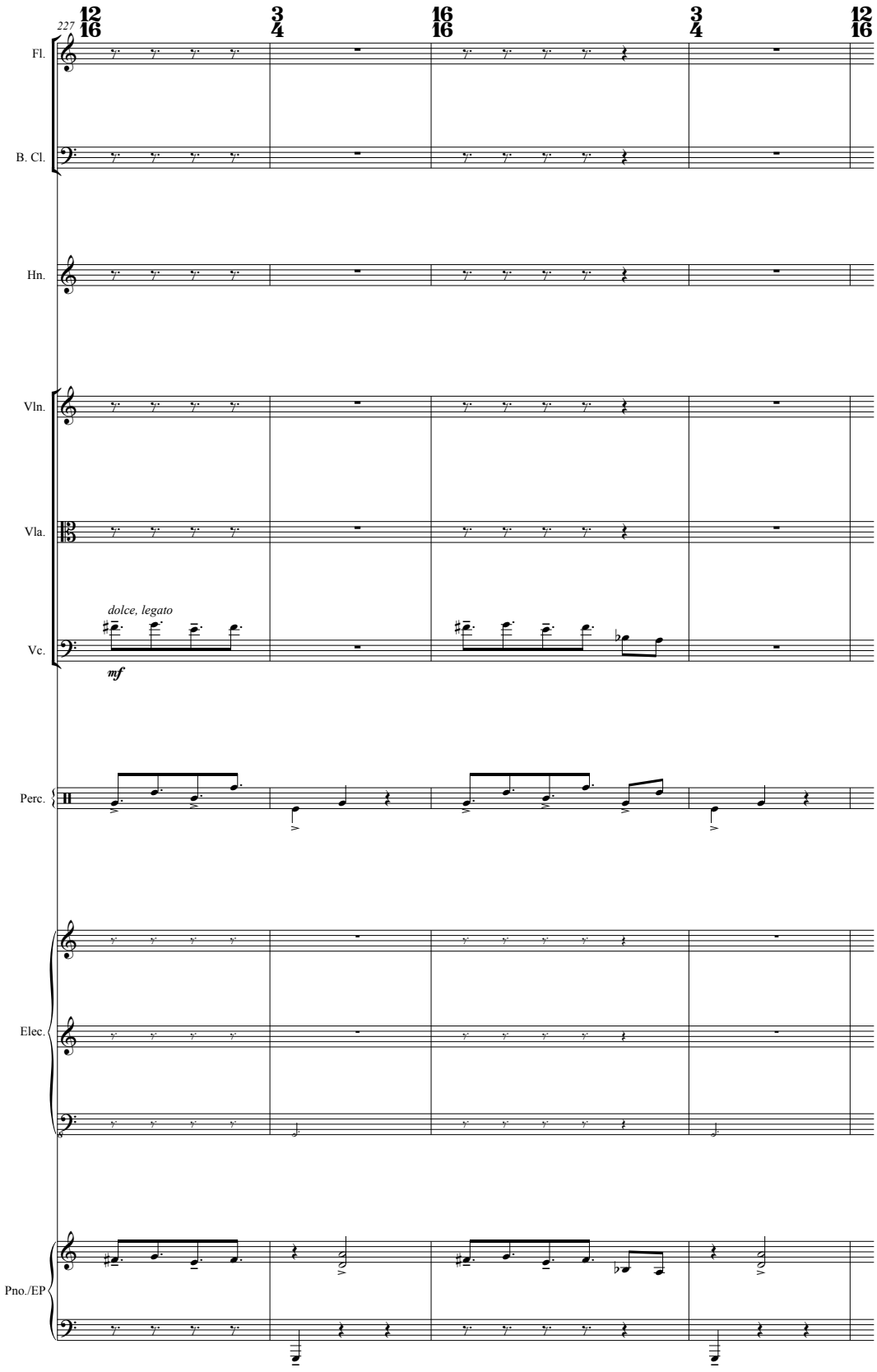

O
soli with Vla. and EP
207
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
soli with Fl. and Pno.
arco
snap pizz.
soli with Fl. and Vla.

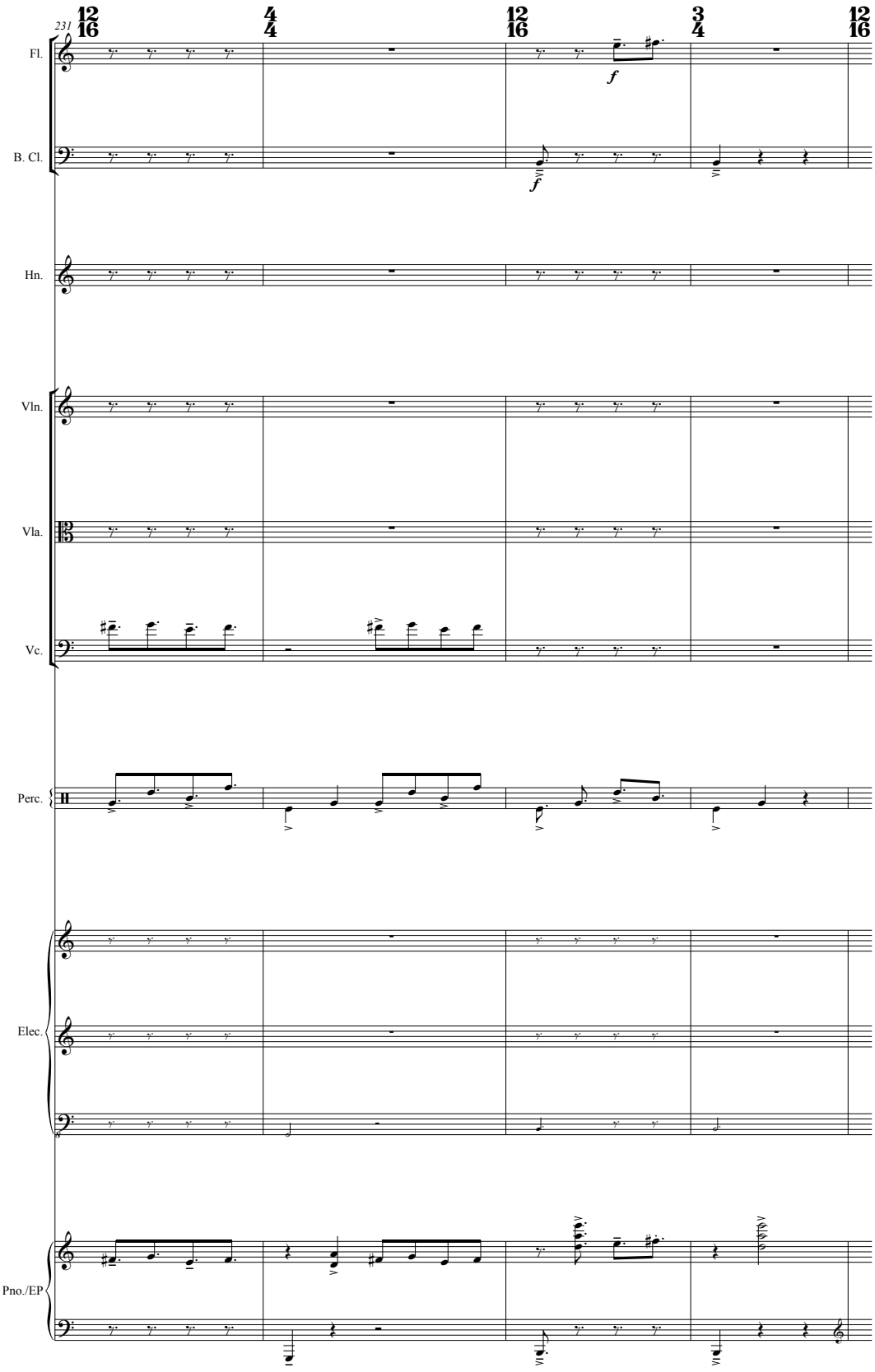

P
211
16 16
3 4
6 8
3 4
12 16
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
ff
ff
ff
f
arco

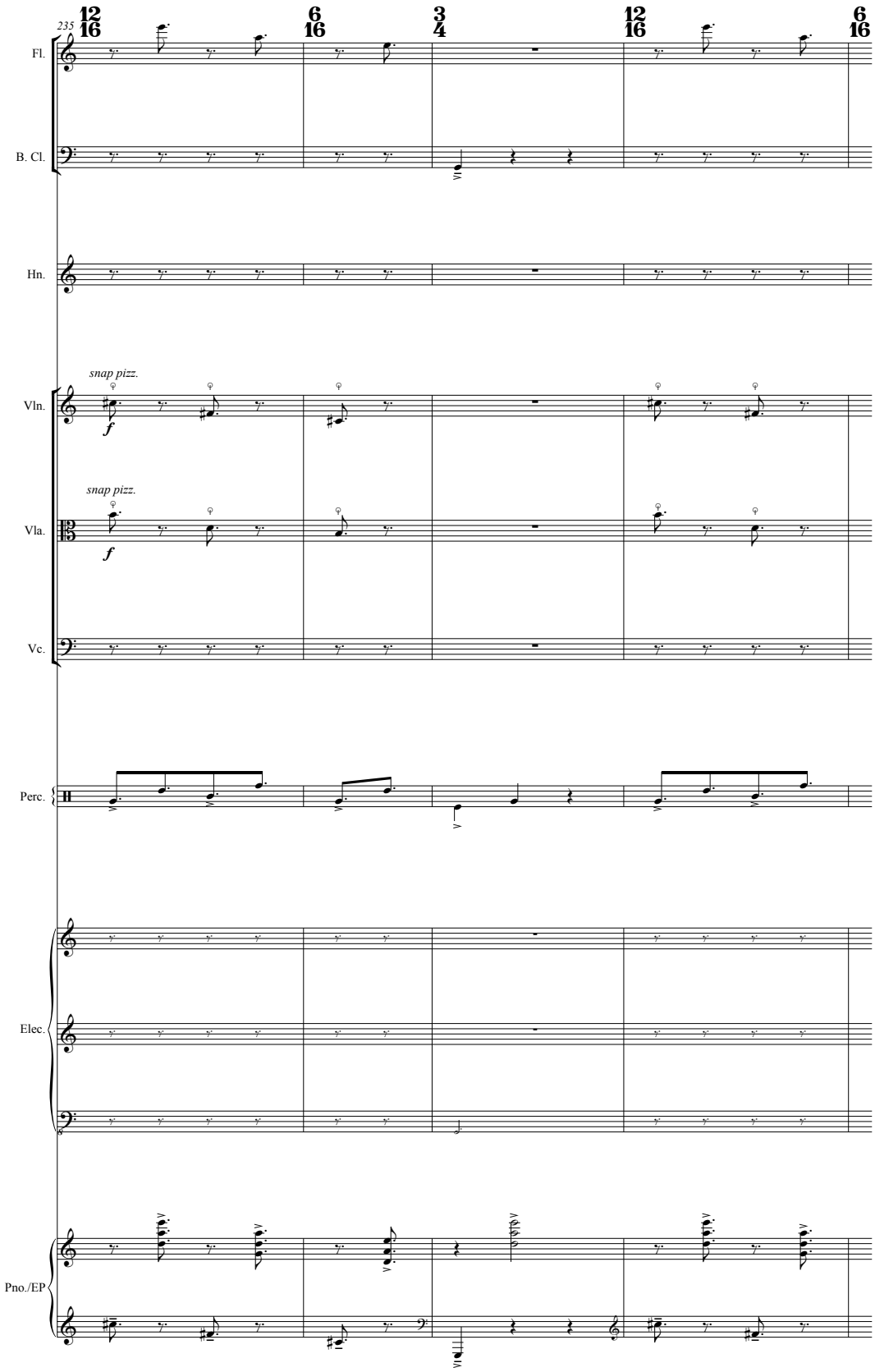

215
12/16
2/4
12/16
6/16
3/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
f
f

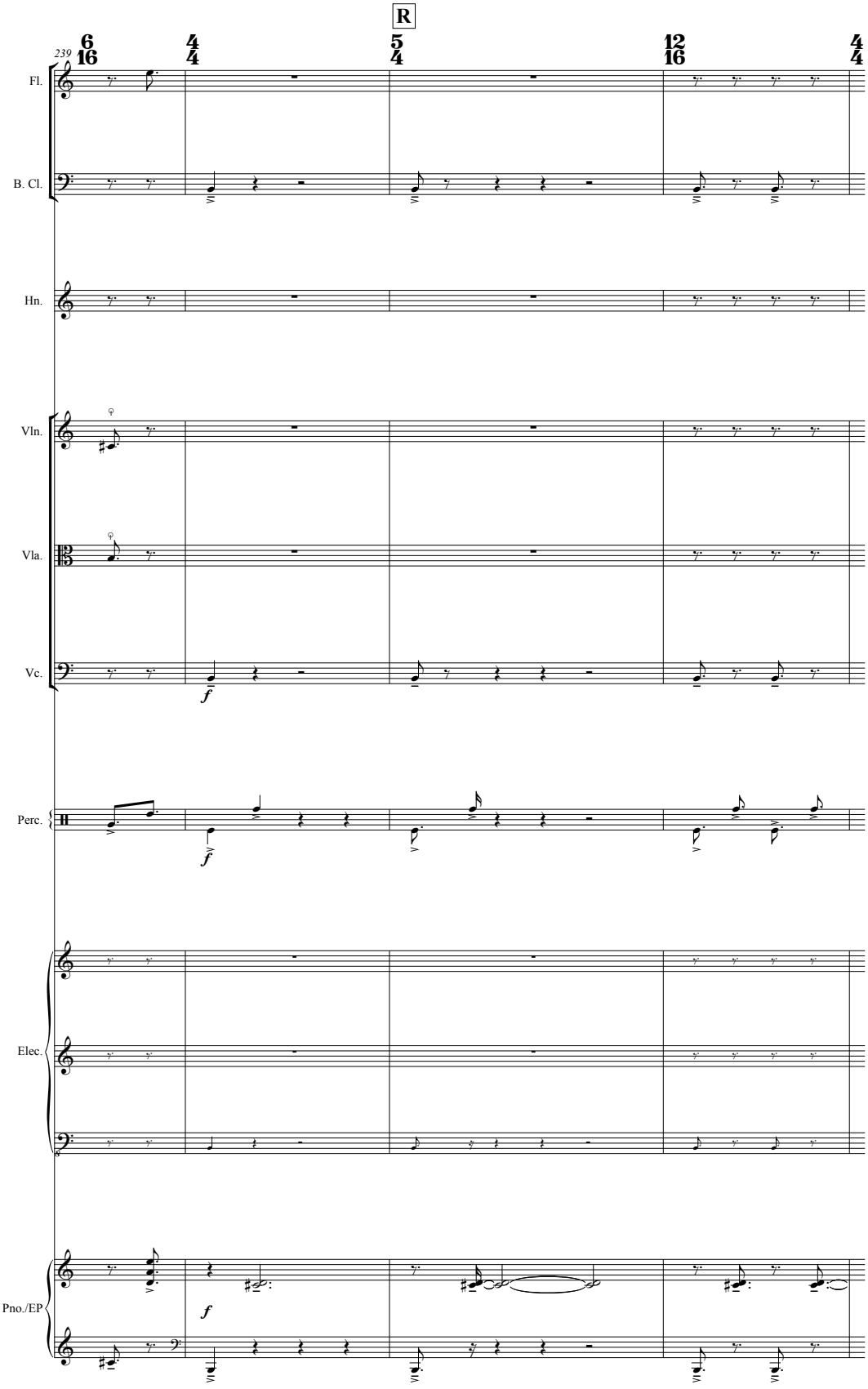

219
3/4
12/16
6/8
3/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
f
f

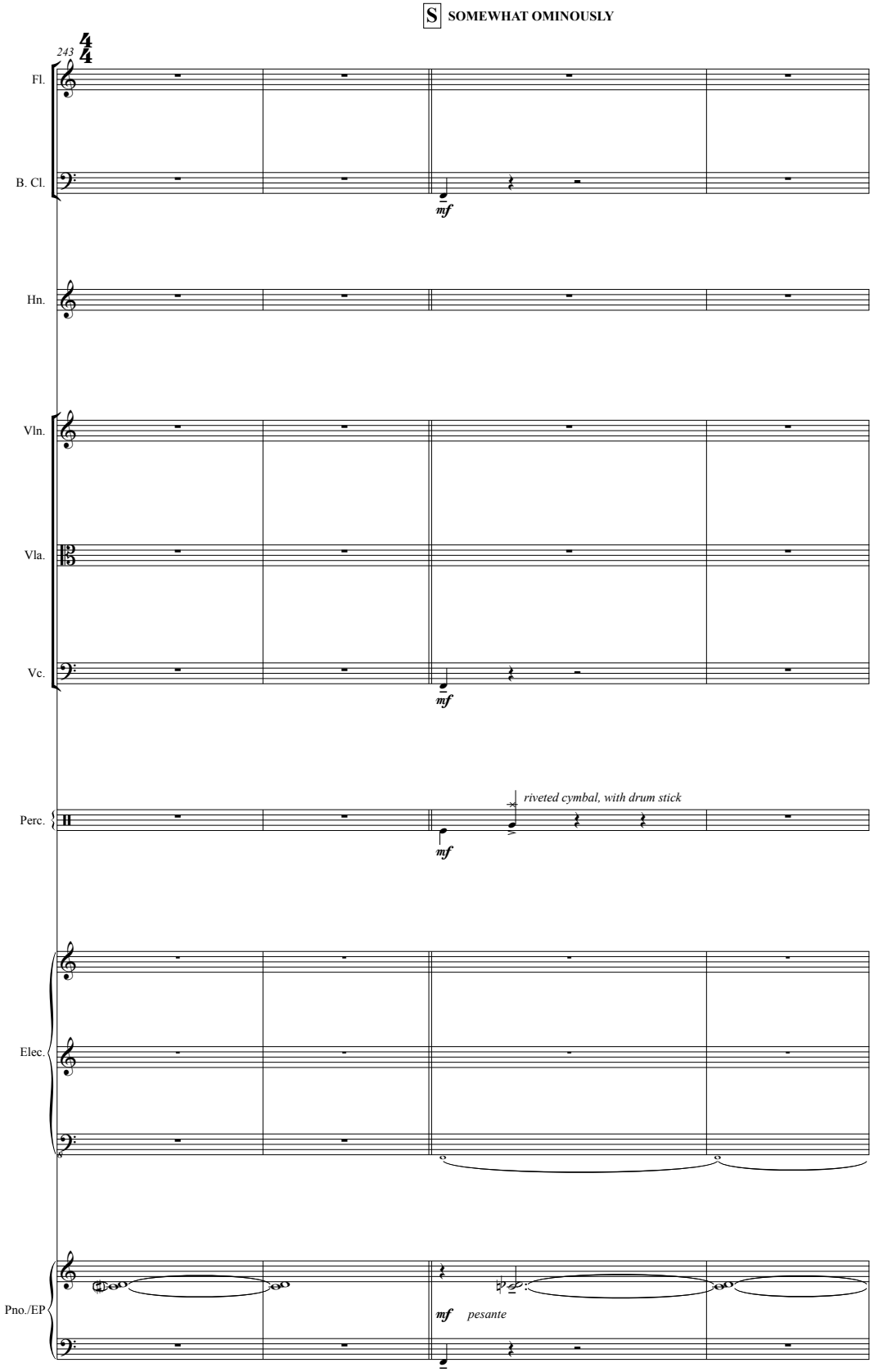

Q
223
3/4
6/8
4/4
12/16
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
ff
p
mf

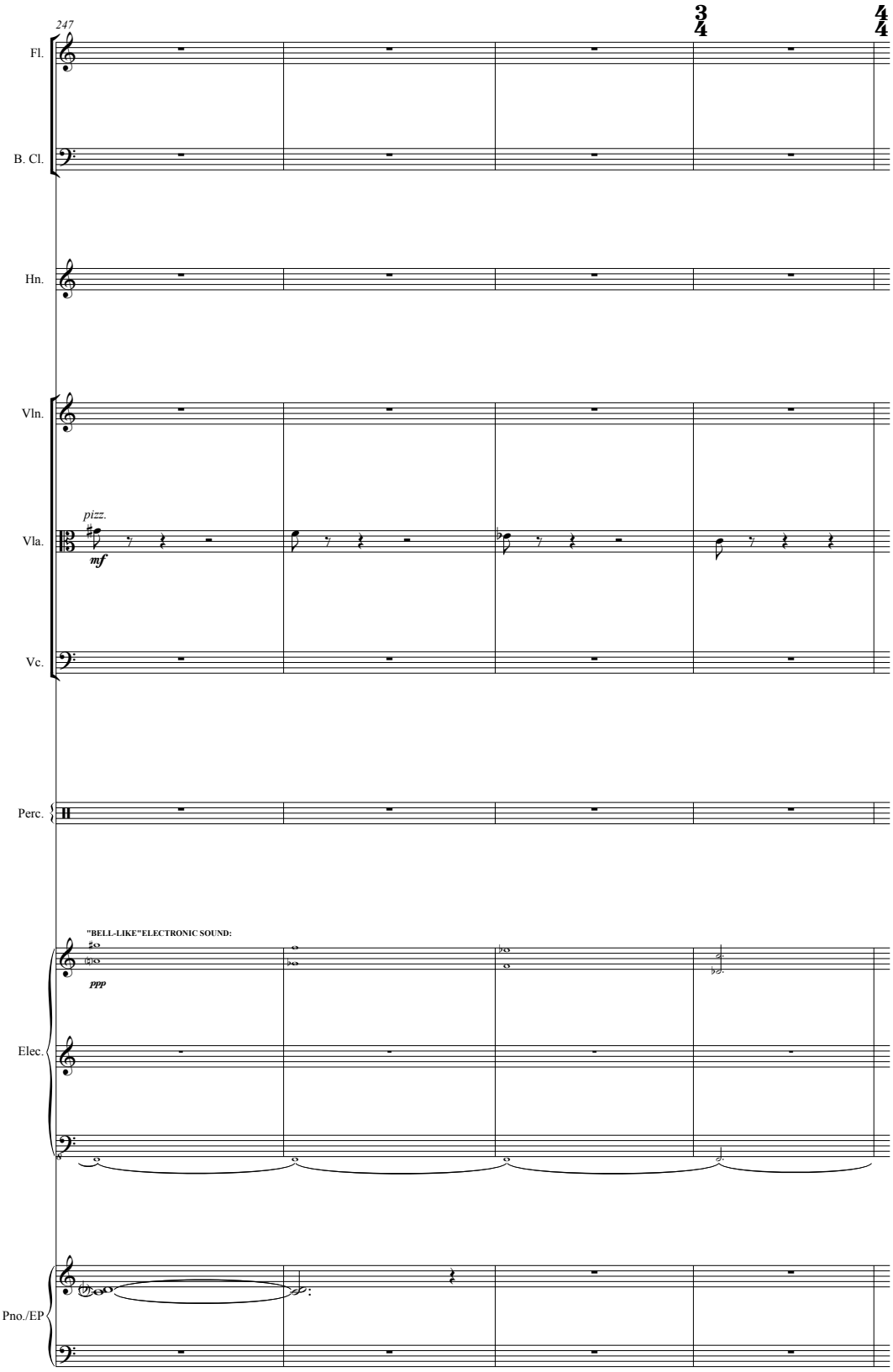

227
12/16
3/4
16/16
3/4
12/16
Fl.
B. Cl.
Hn.
Vln.
Vla.
dolce, legato
mf
Vc.
Perc.
Elec.
Pno./EP

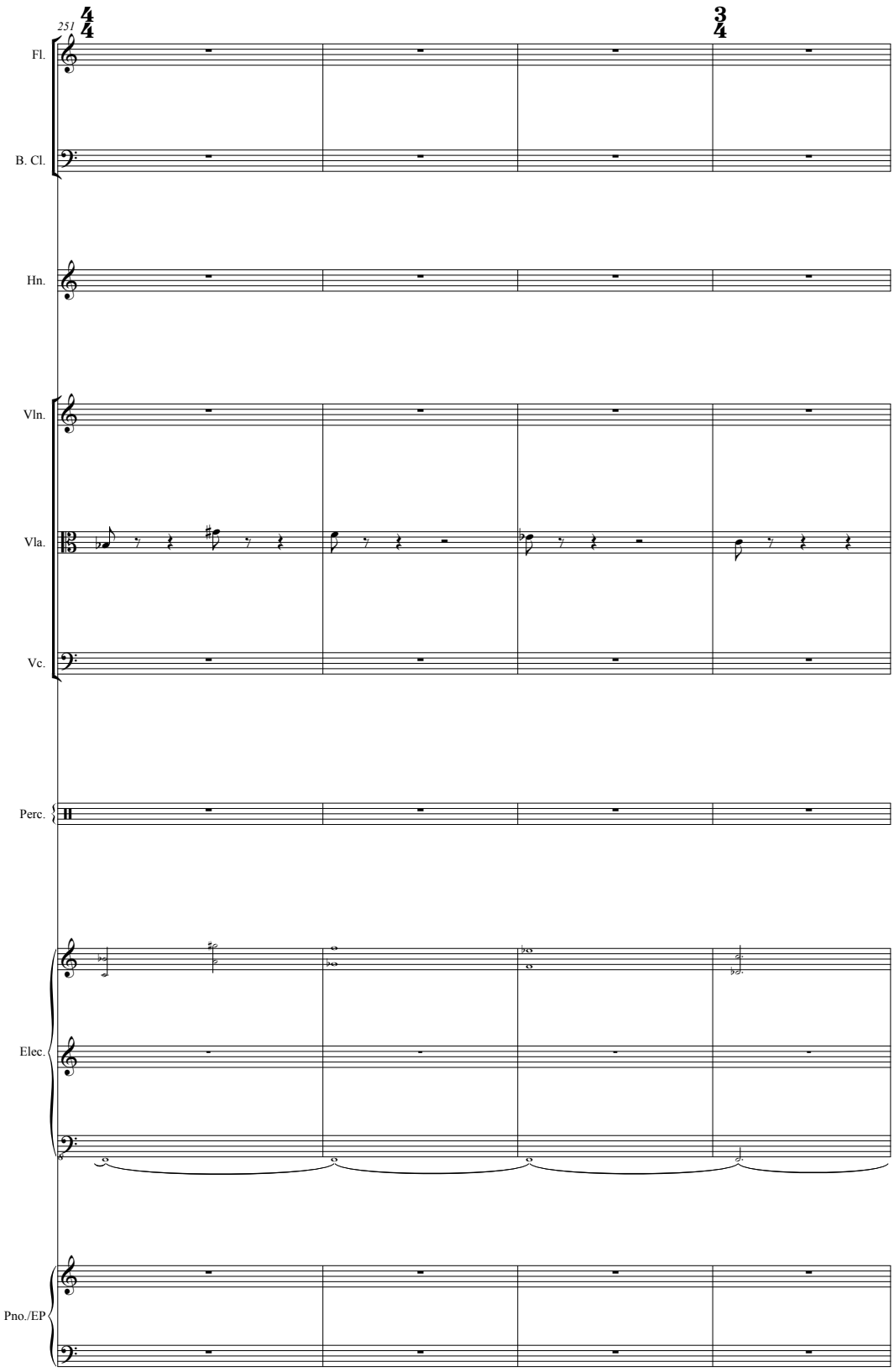

231
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

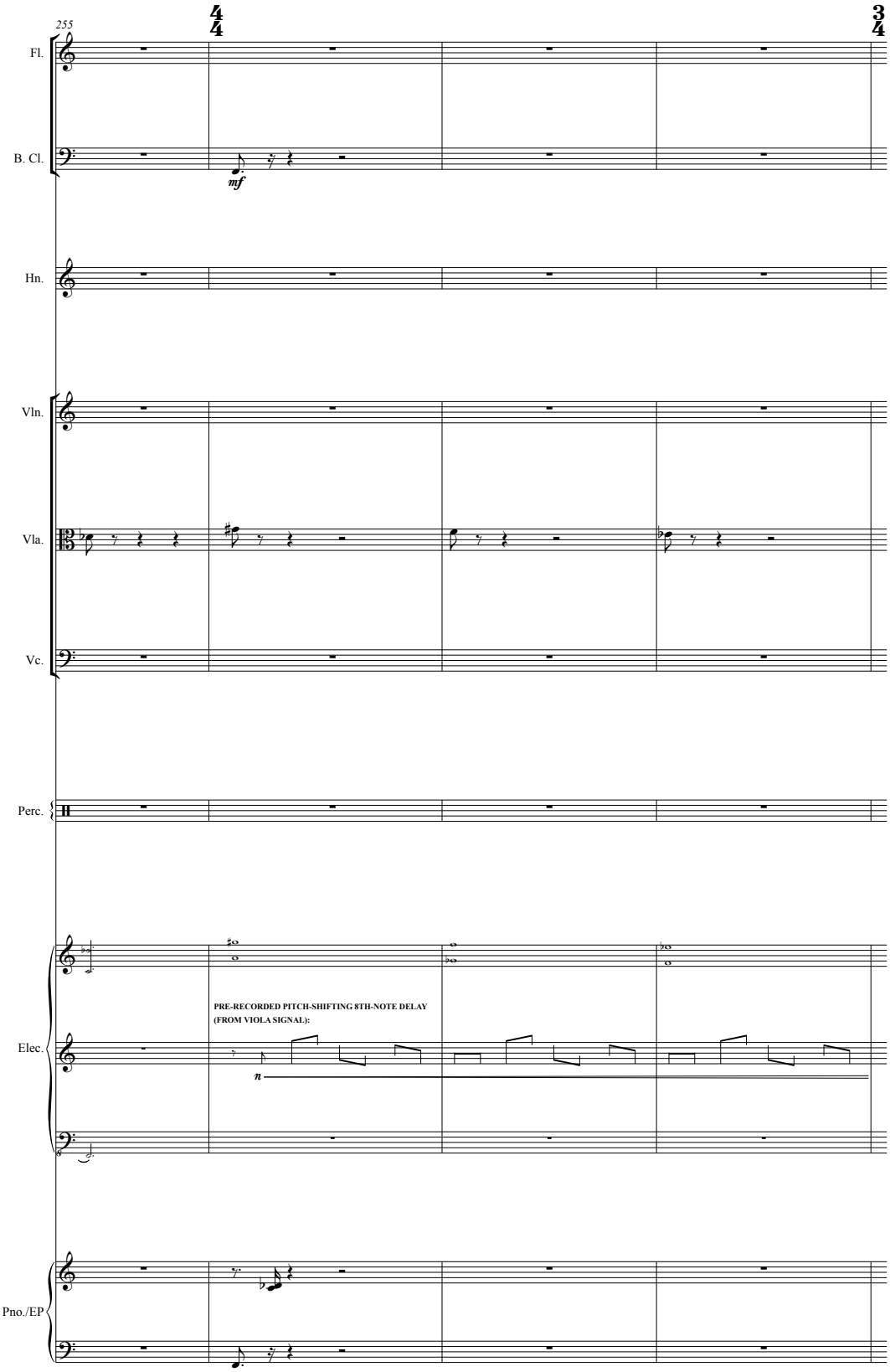

235
12/16
6/16
3/4
12/16
6/16
Fl.
B. Cl.
Hn.
snap pizz.
Vln.
snap pizz.
Vla.
Vc.
Perc.
Elec.
Pno./EP

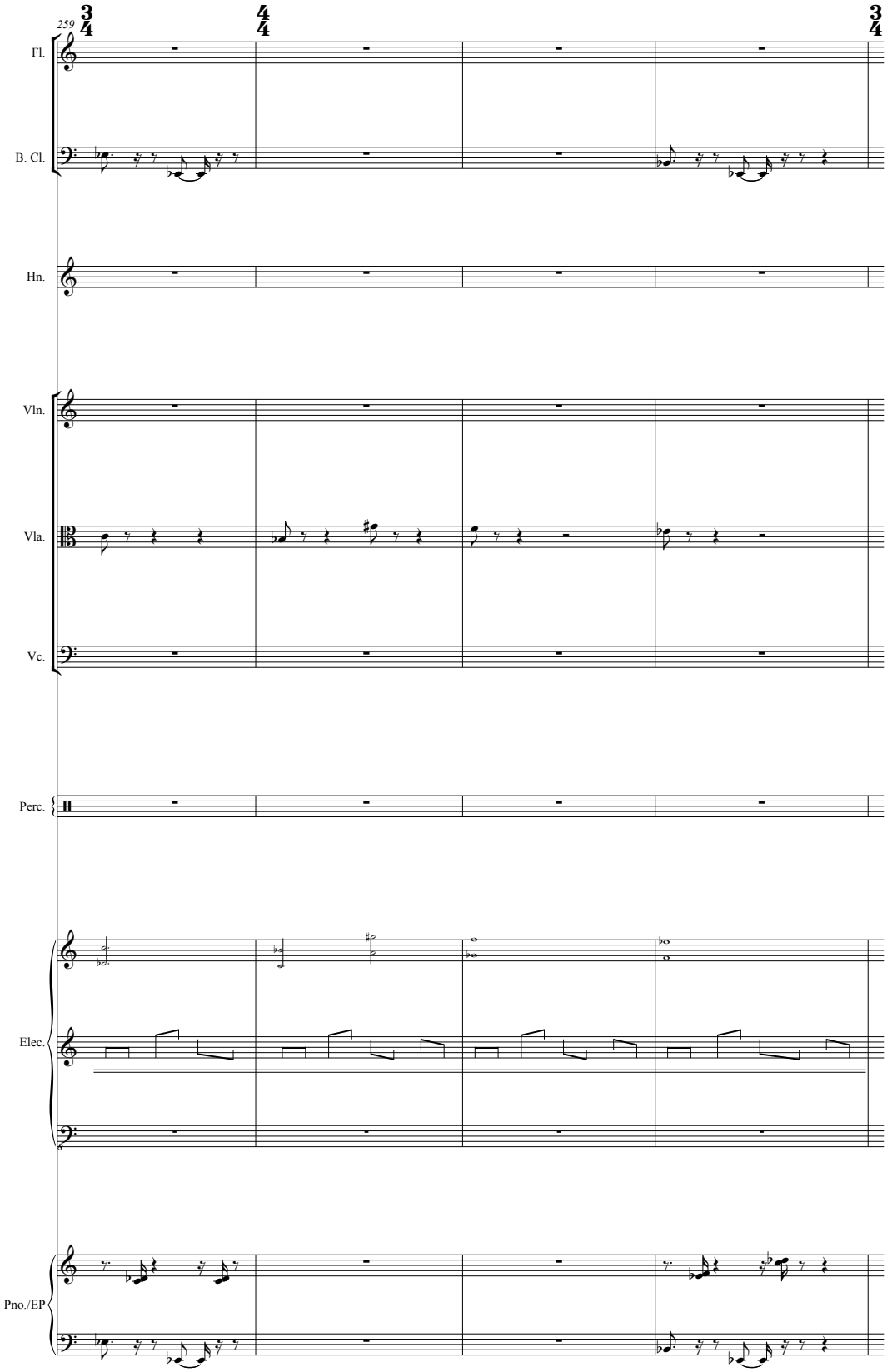

R
239
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
f

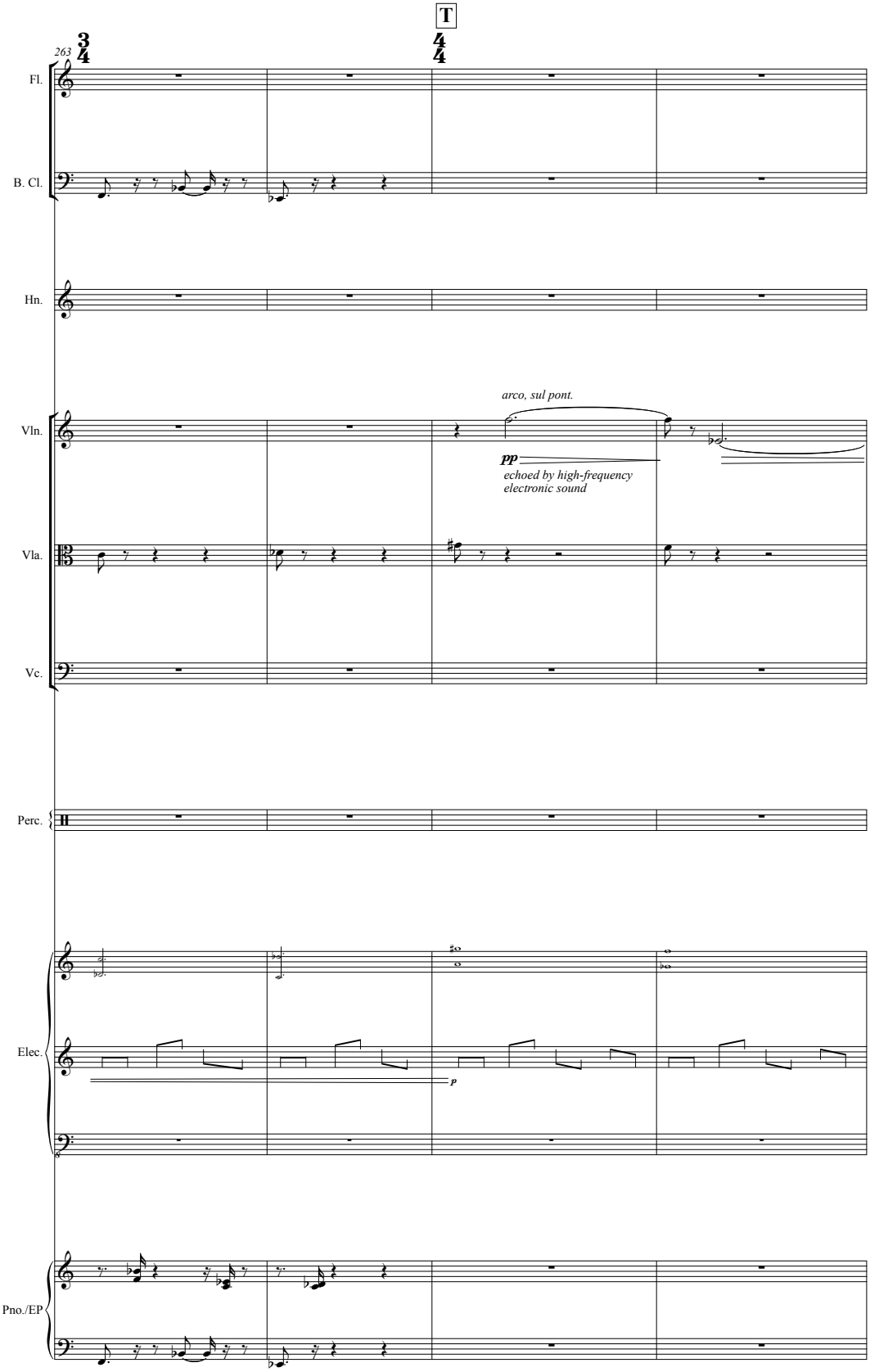

S SOMEWHAT OMINOUSLY
243
Fl.
B. Cl.
mf
Hn.
Vln.
Vla.
Vc.
mf
Perc.
riveted cymbal, with drum stick
mf
Elec.
Pno./EP
mf pesante

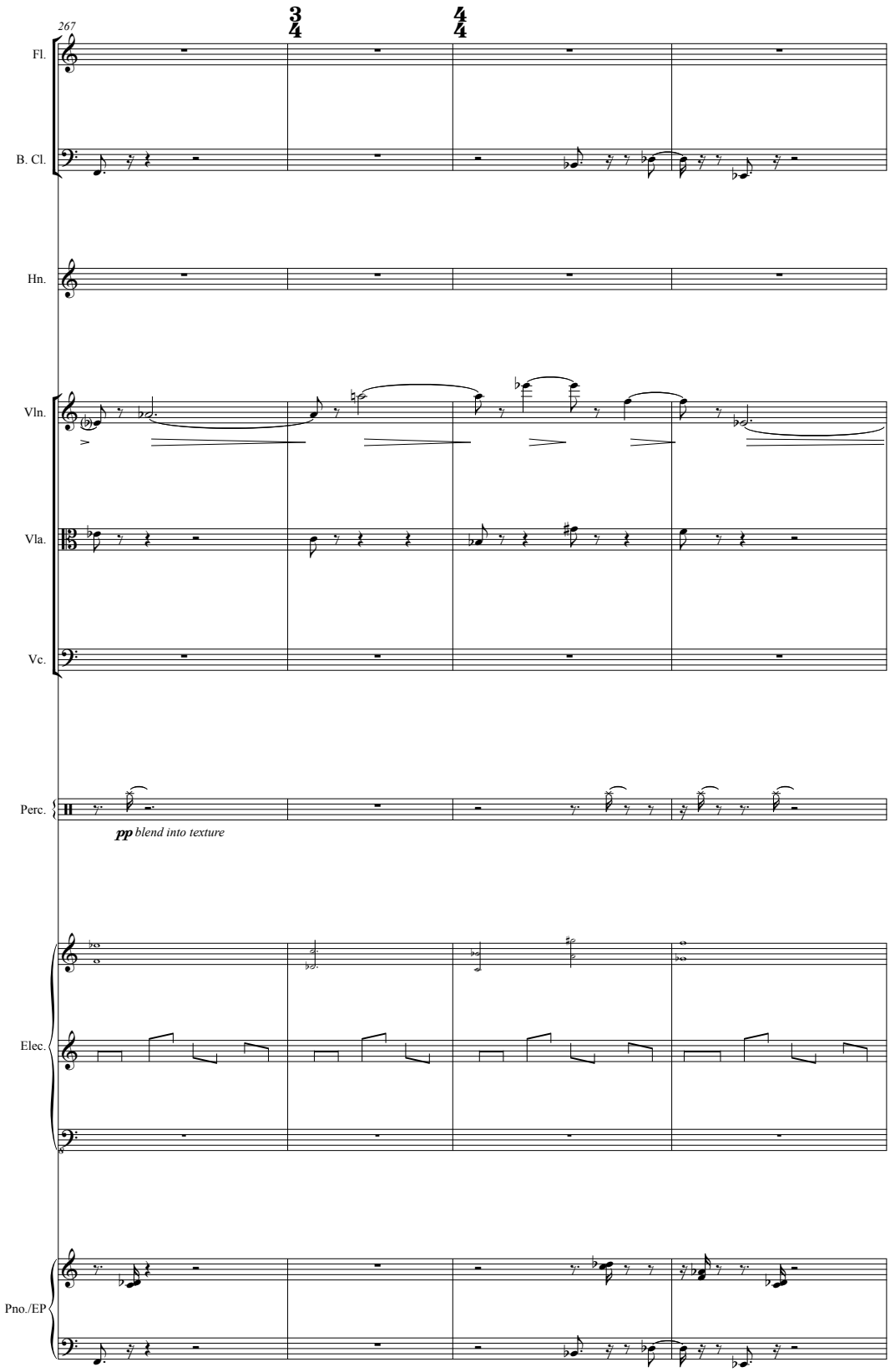

247
3/4
4/4
Fl.
B. Cl.
Hn.
Vln.
pizz.
mf
Vla.
Vc.
Perc.
"BELL-LIKE"ELECTRONIC SOUND:
ppp
Elec.
Pno./EP

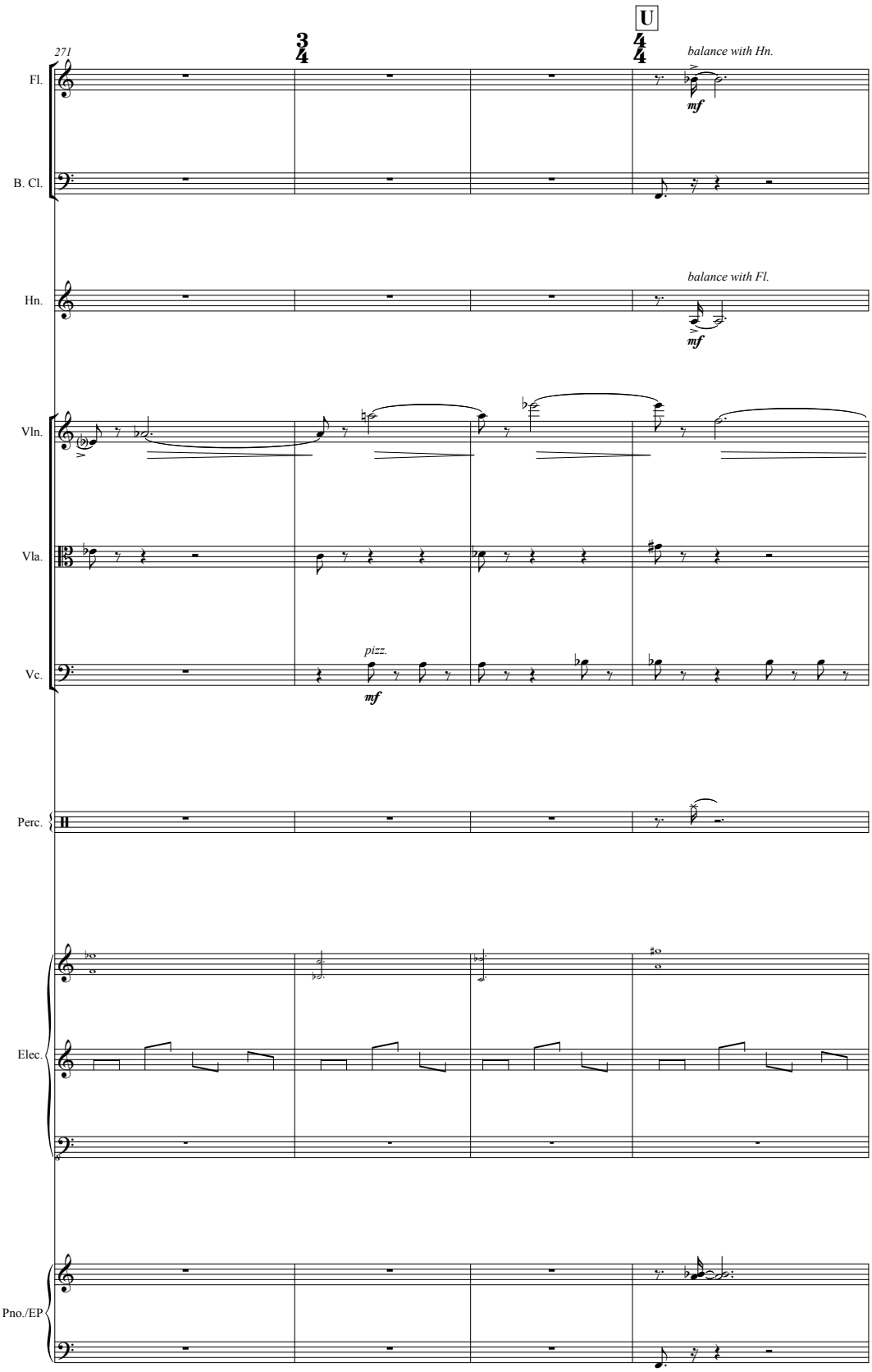

251
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

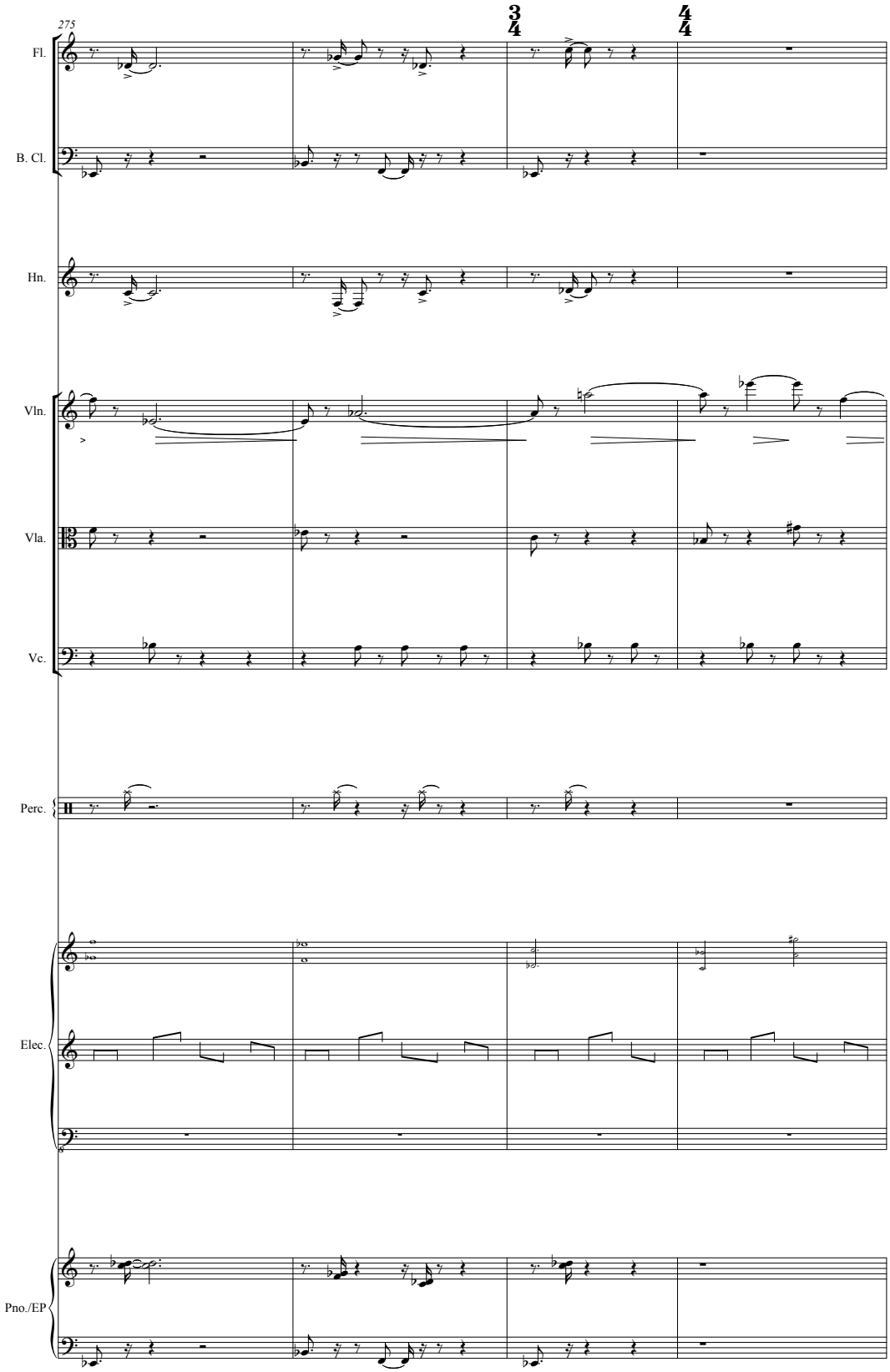

255
Fl.
B. Cl.
mf
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
PRE-RECORDED PITCH-SHIFTING 8TH-NOTE DELAY
(FROM VIOLA SIGNAL):
Pno./EP

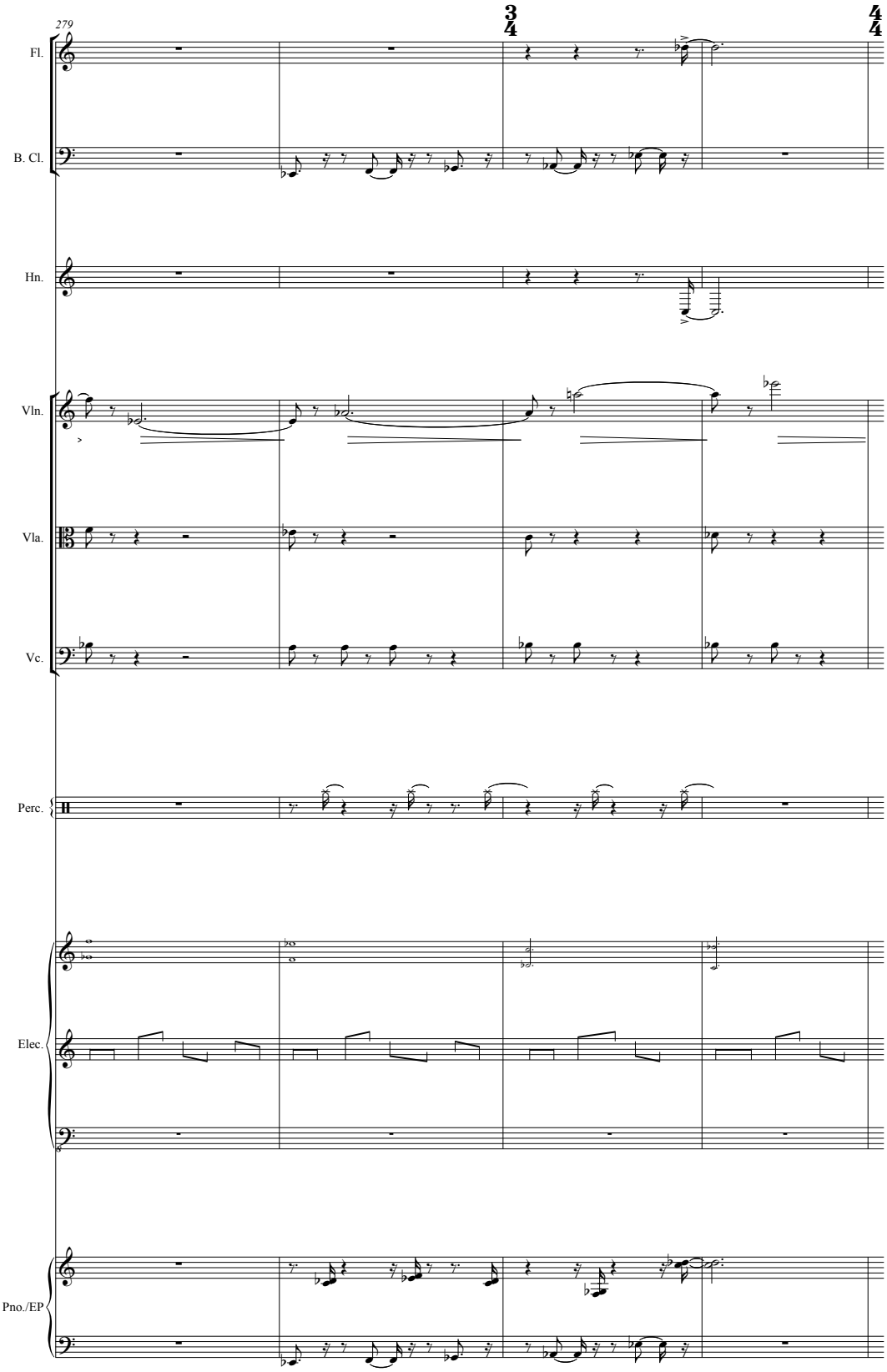

259
3/4
4/4
3/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

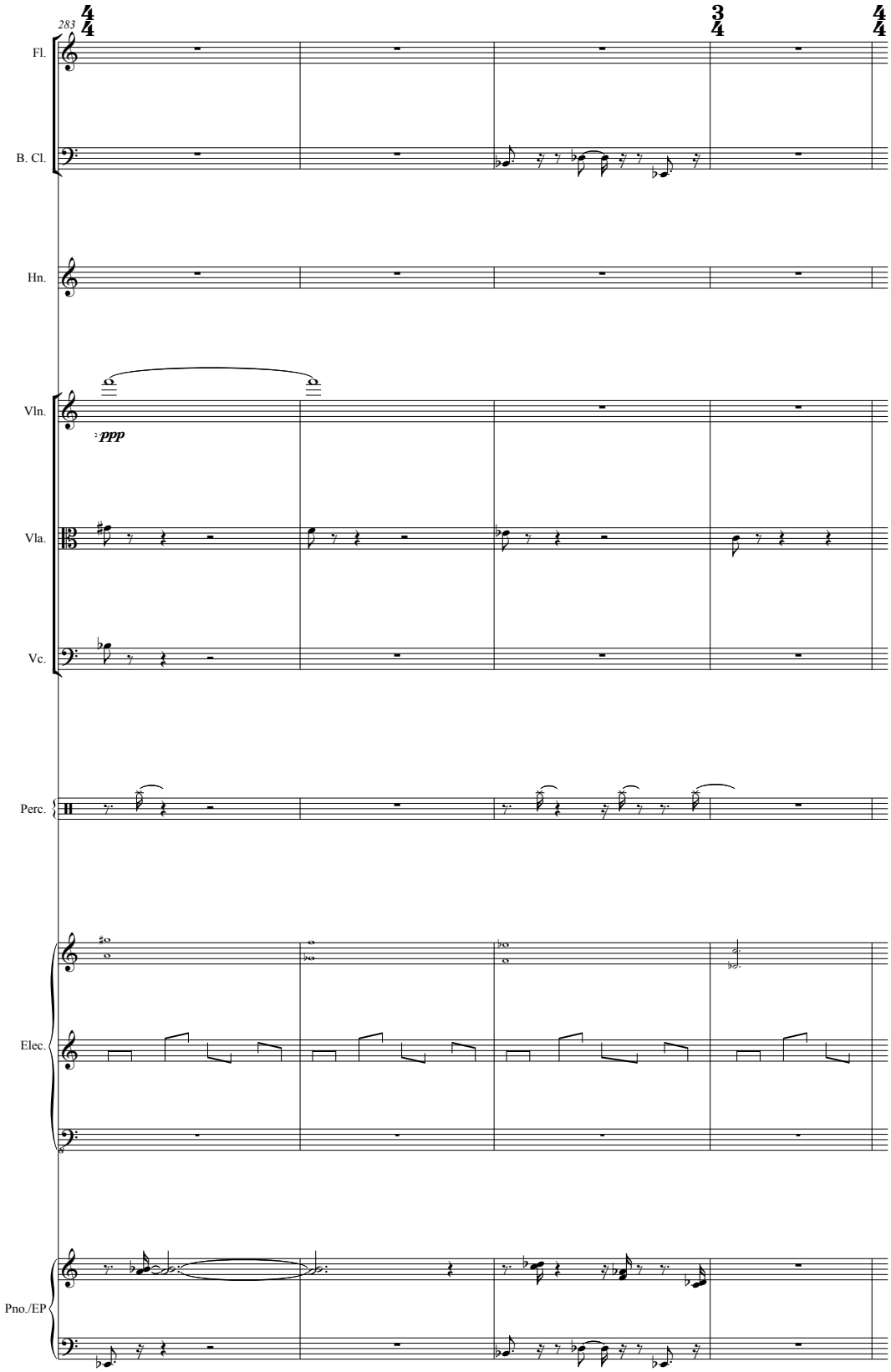

T
263
3/4
4/4
Fl.
B. Cl.
Hn.
Vln.
arco, sul pont.
pp
echoed by high-frequency electronic sound
Vla.
Vc.
Perc.
Elec.
p
Pno./EP

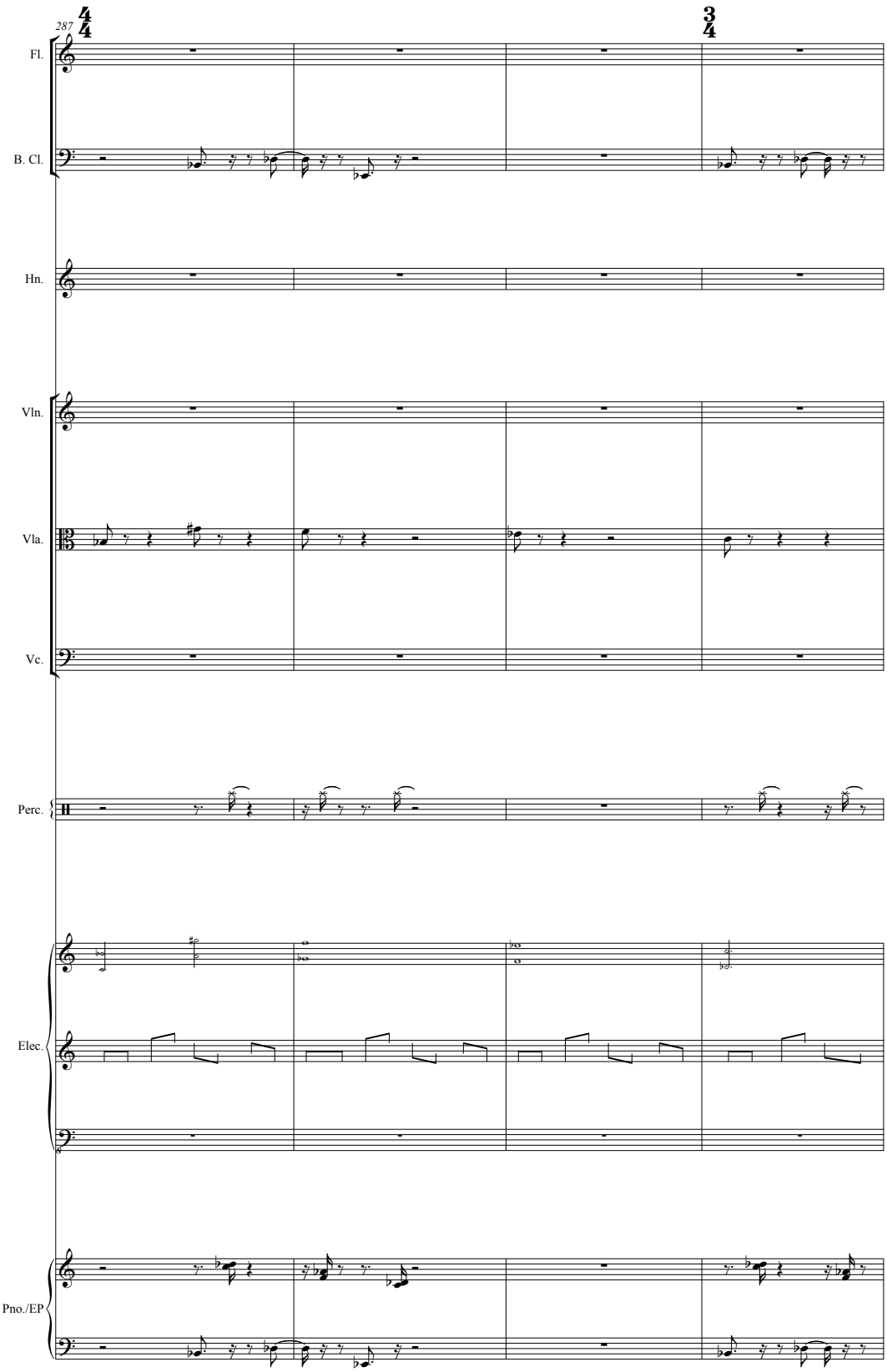

267
3/4
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
pp blend into texture
Elec.
Pno./EP

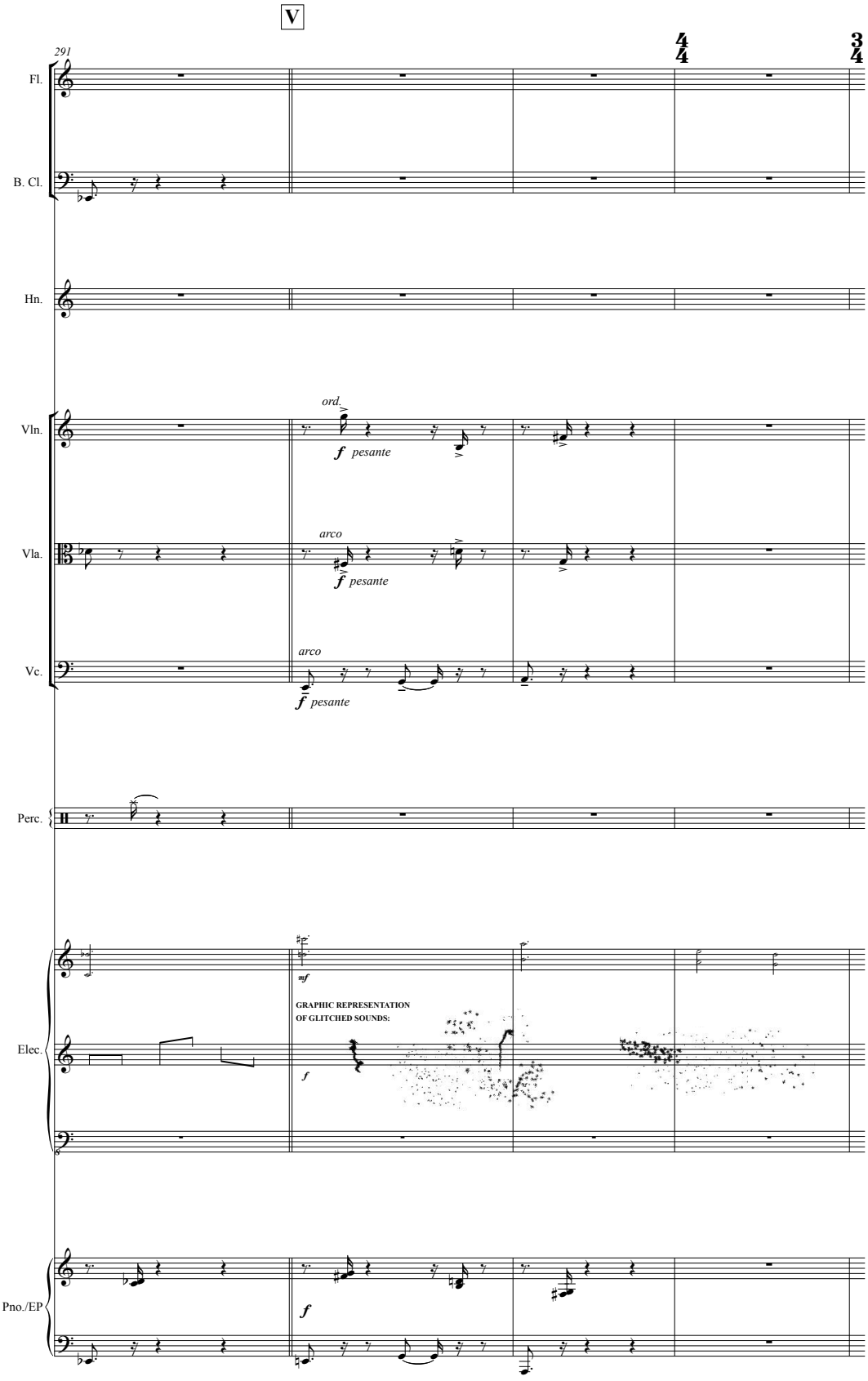

271
U
balance with Hn.
mf
Fl.
B. Cl.
balance with Fl.
mf
Hn.
Vln.
Vla.
pizz.
mf
Vc.
Perc.
Elec.
Pno./EP

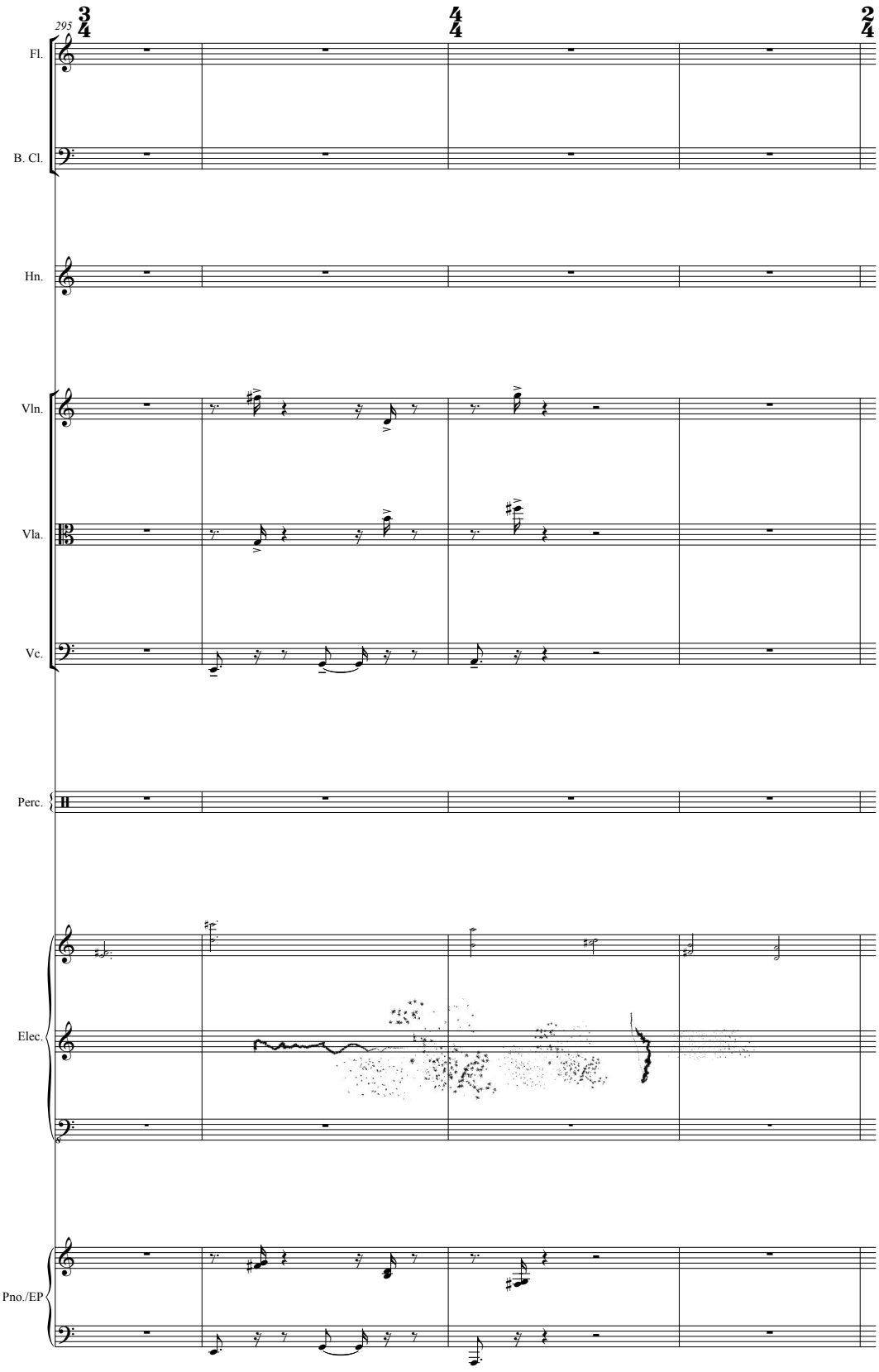

275
3/4
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

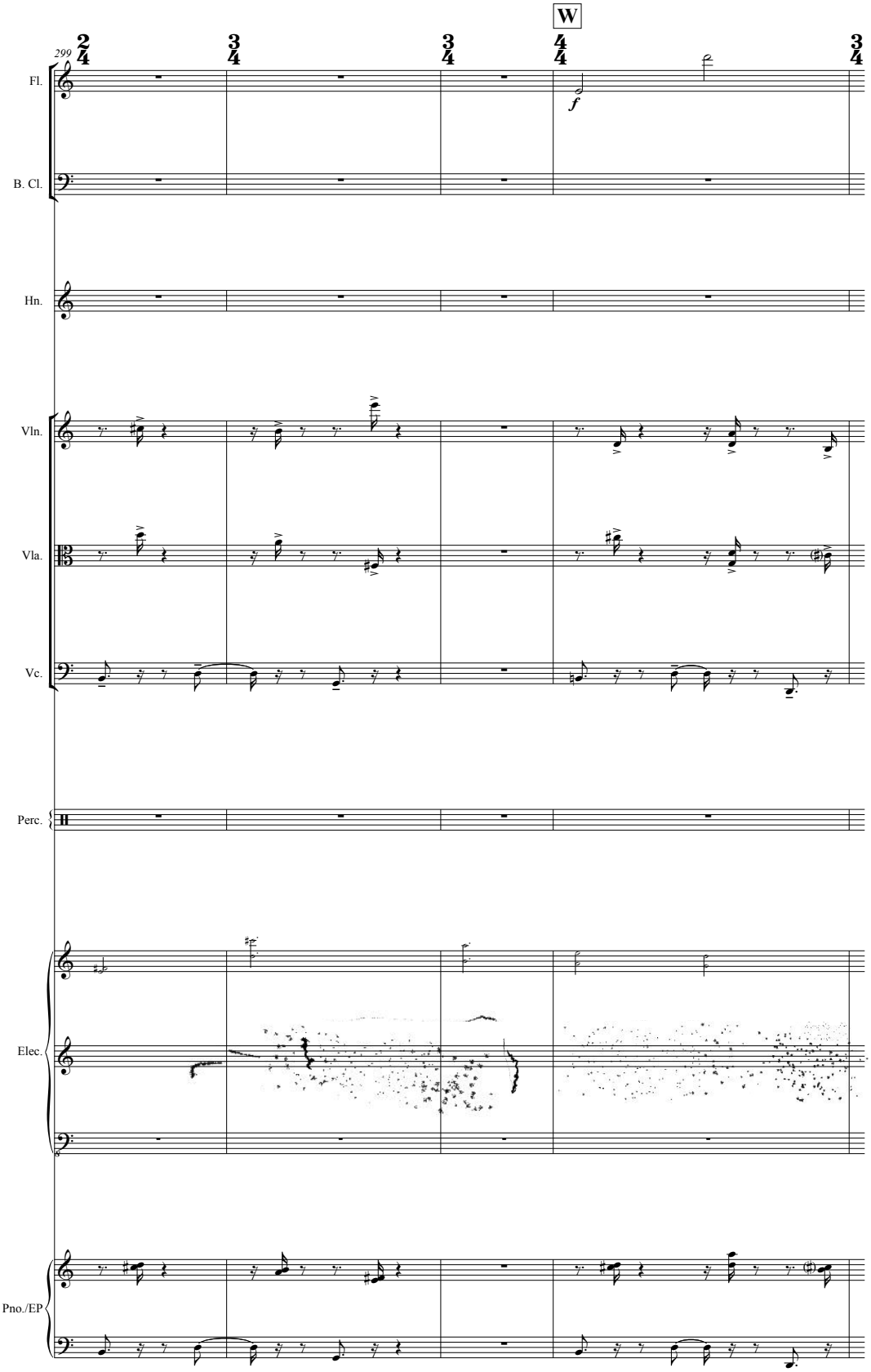

279
3/4
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

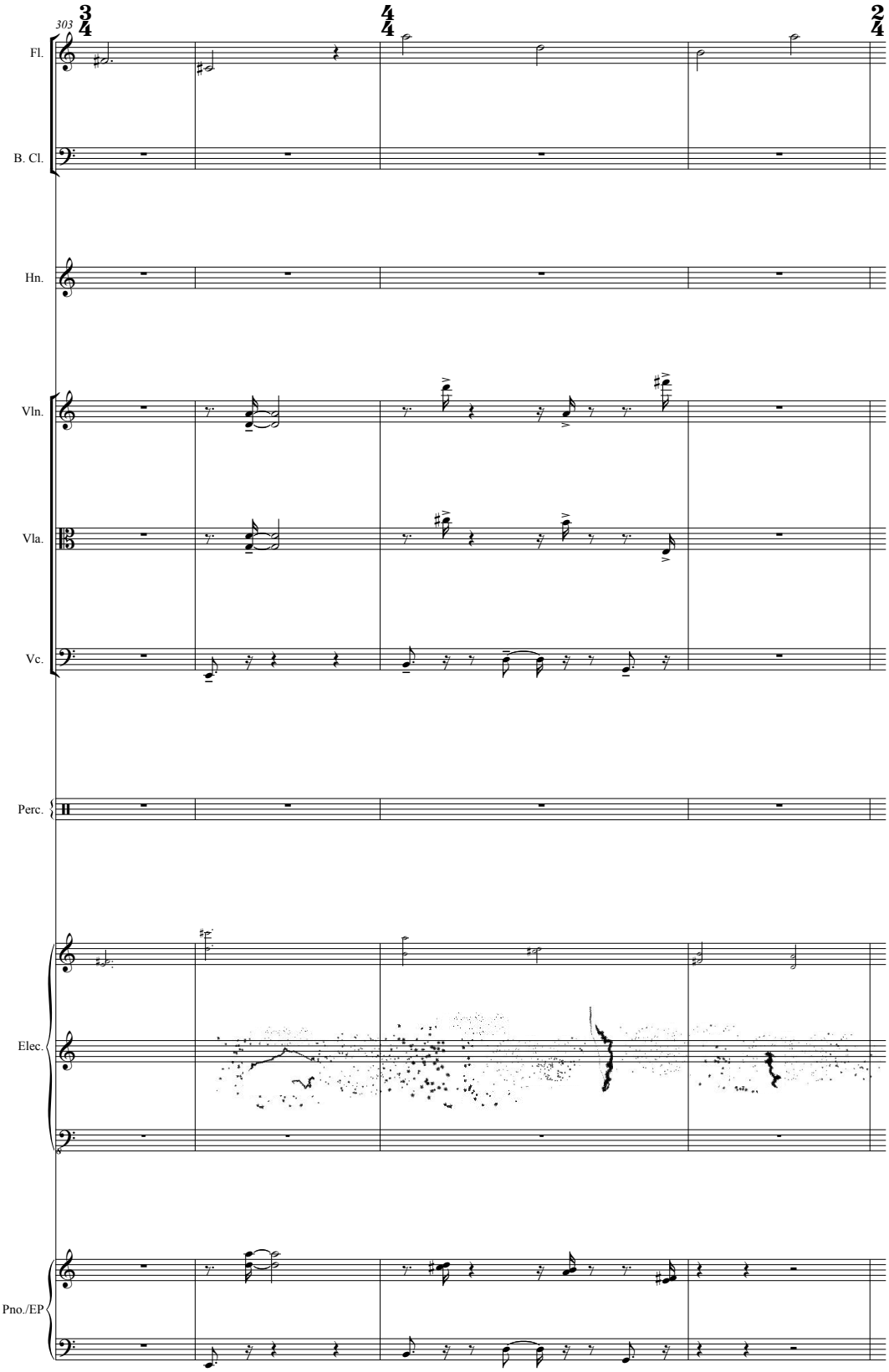

283
Fl.
B. Cl.
Hn.
Vln.
ppp
Vla.
Vc.
Perc.
Elec.
Pno./EP

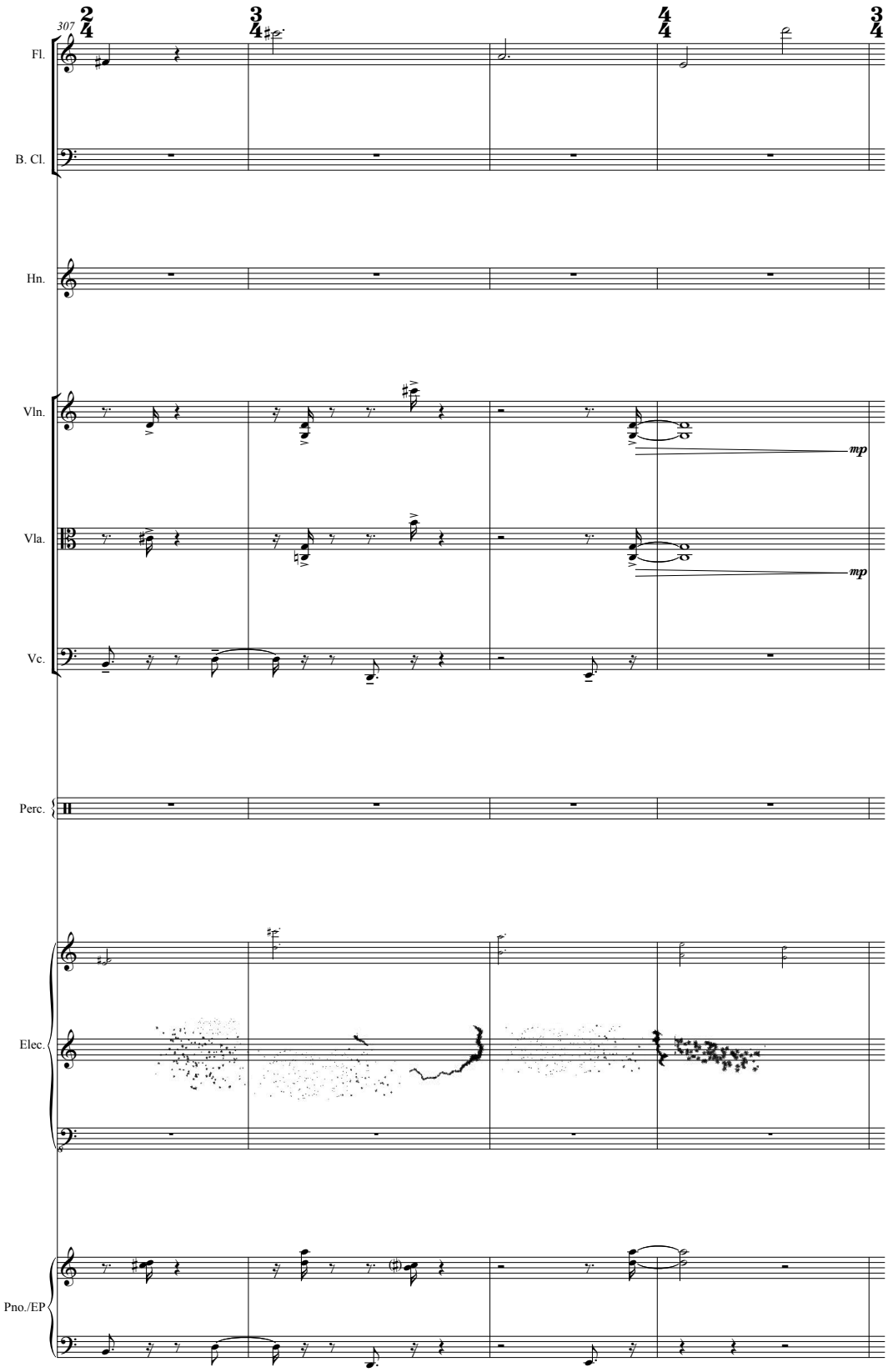

287
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

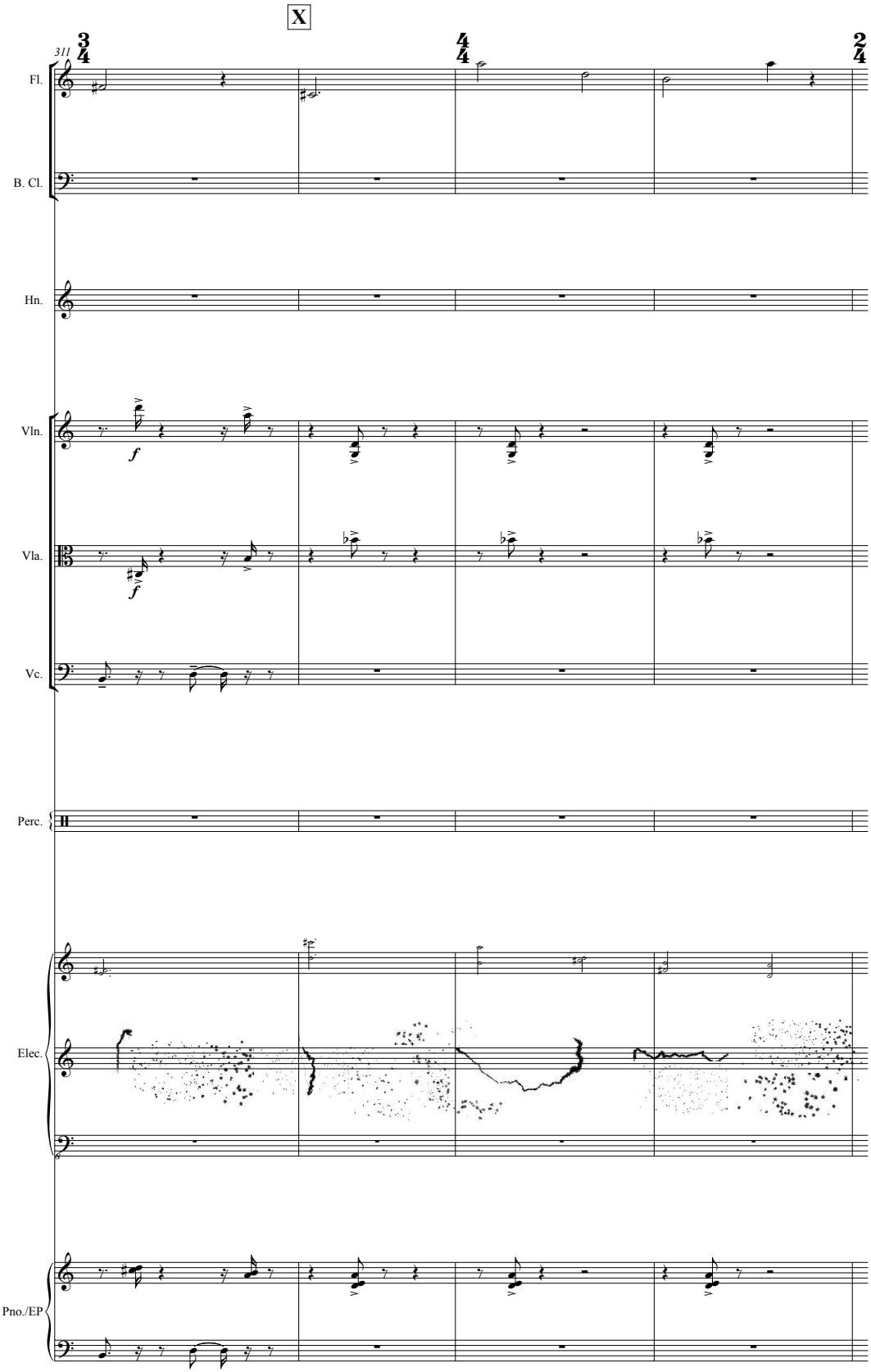

V
291
4/4
3/4
Fl.
B. Cl.
Hn.
Vln.
ord.
f pesante
Vla.
arco
f pesante
Vc.
arco
f pesante
Perc.
Elec.
mf
GRAPHIC REPRESENTATION
OF GLITCHED SOUNDS:
f
Pno./EP
f

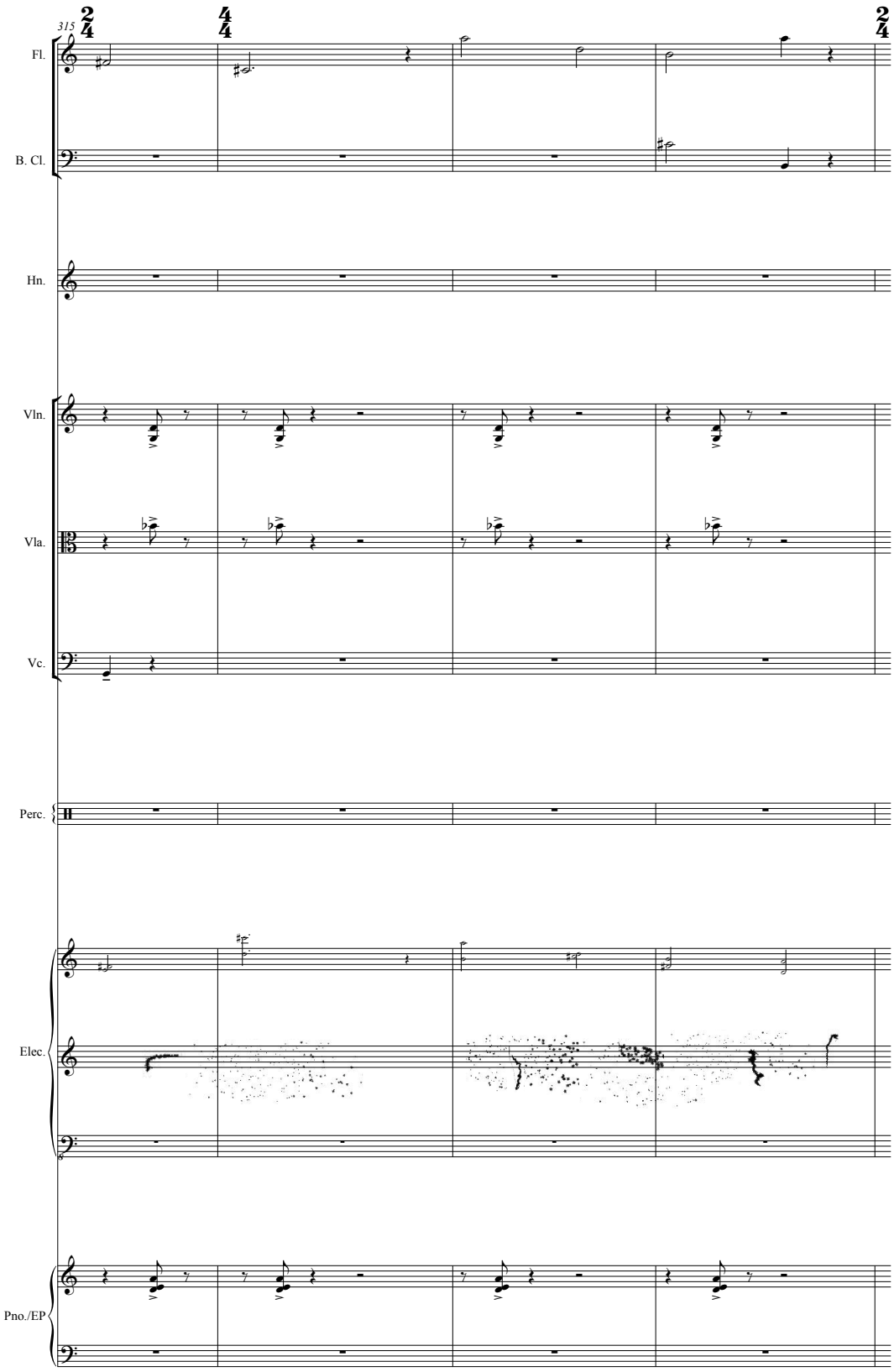

295
3/4
4/4
2/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

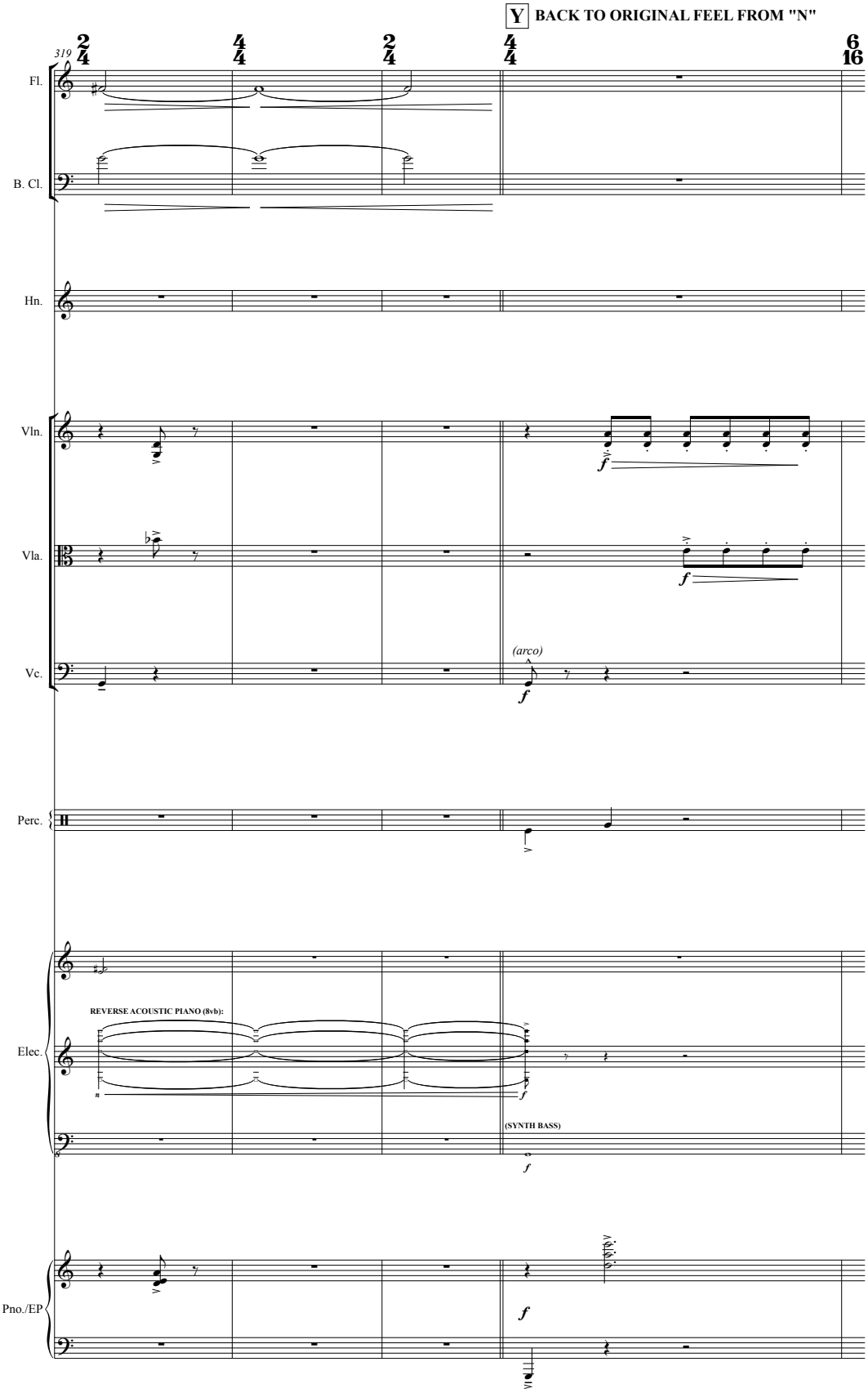

W
299
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

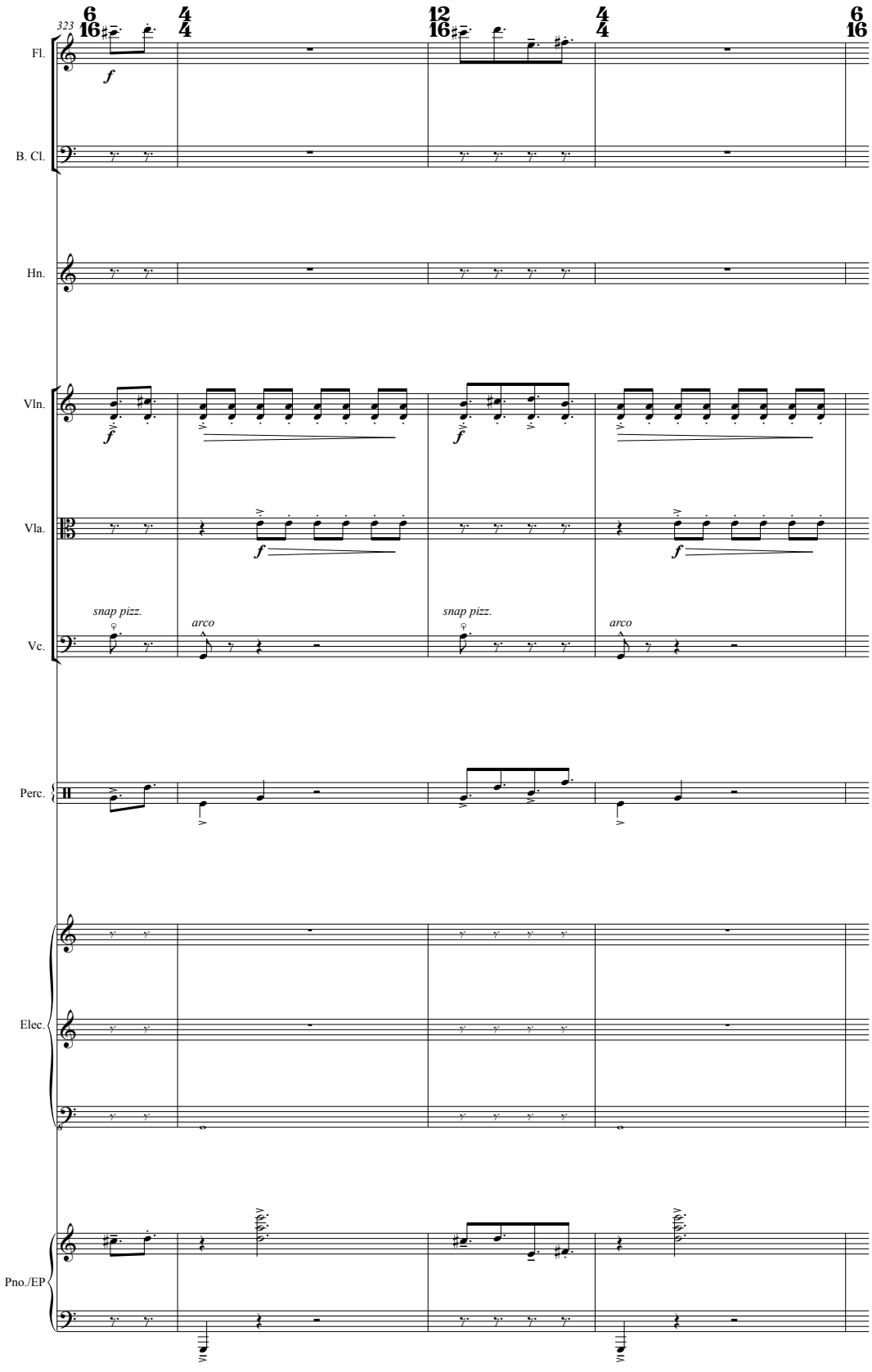

303
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

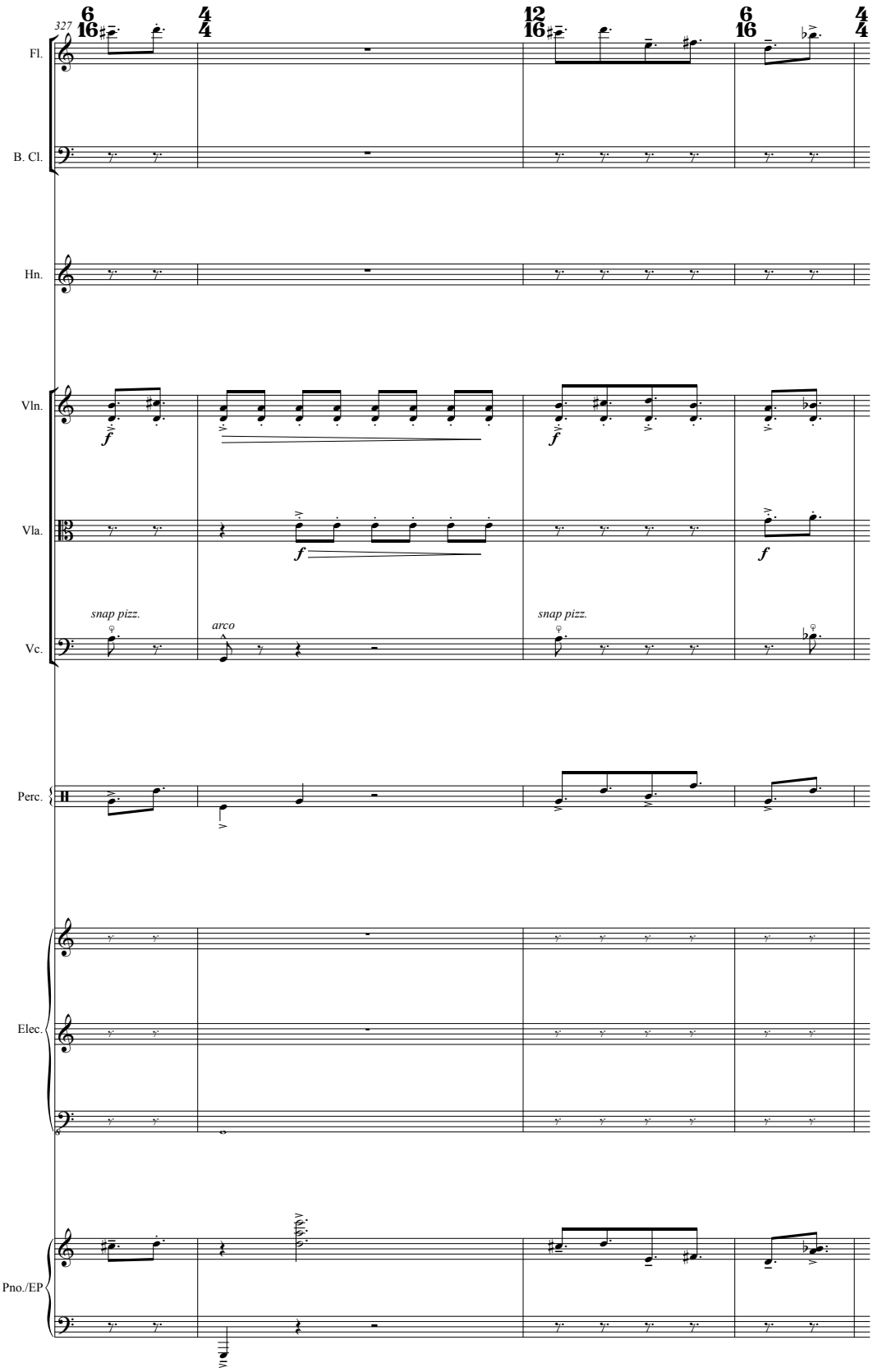

307
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
mp
mp

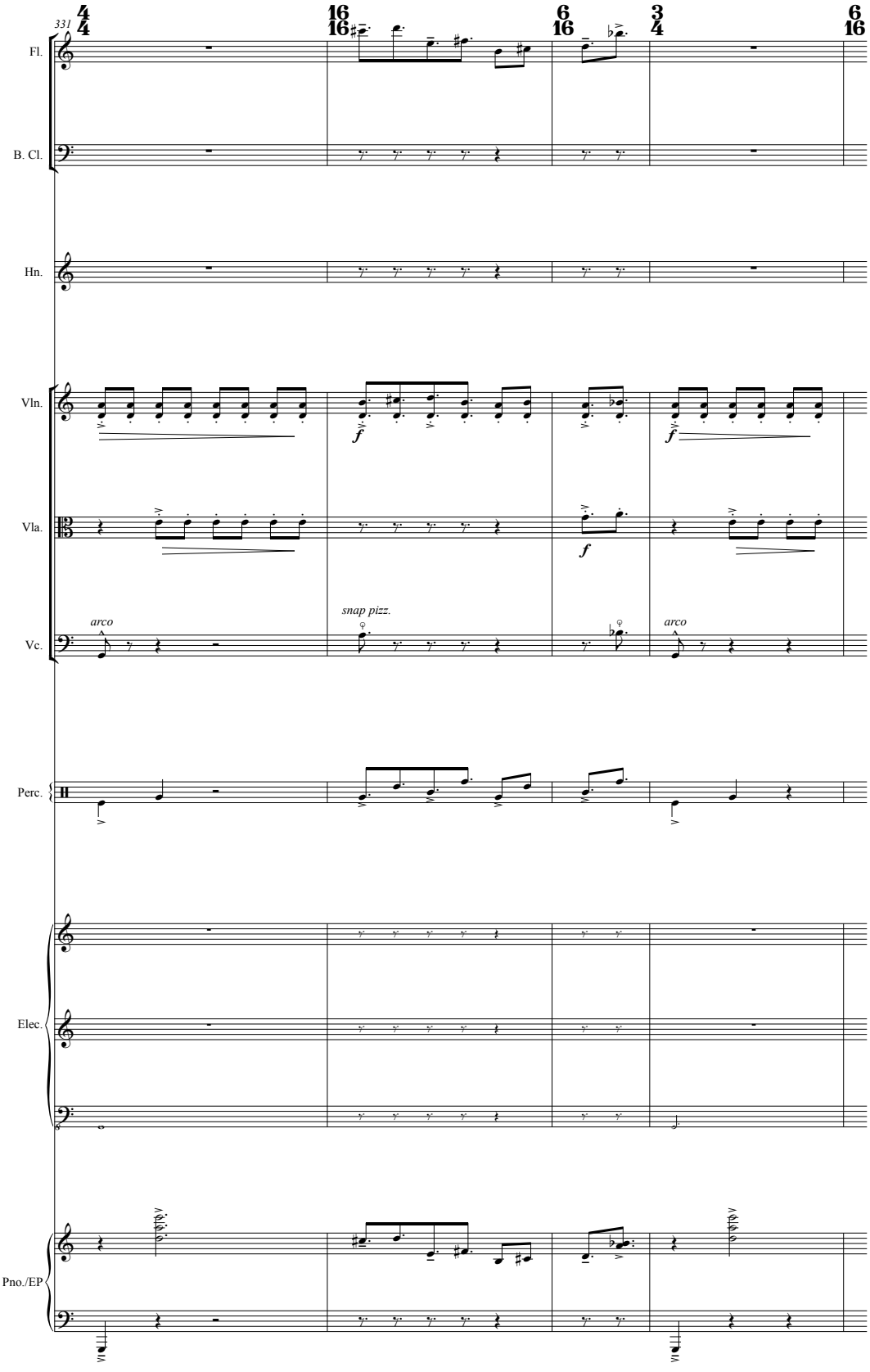

X
311
3/4
4/4
2/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
f
f

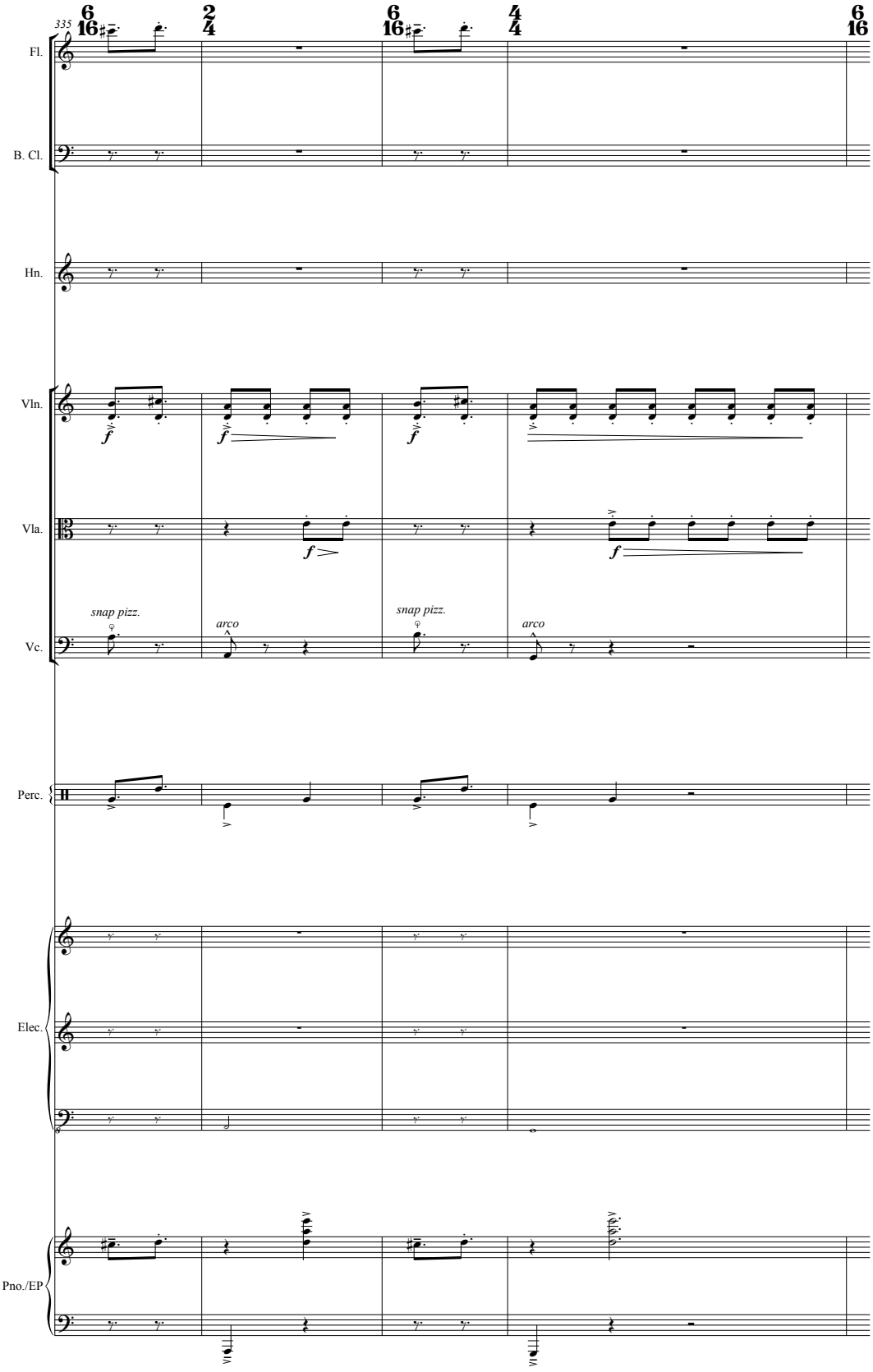

315
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

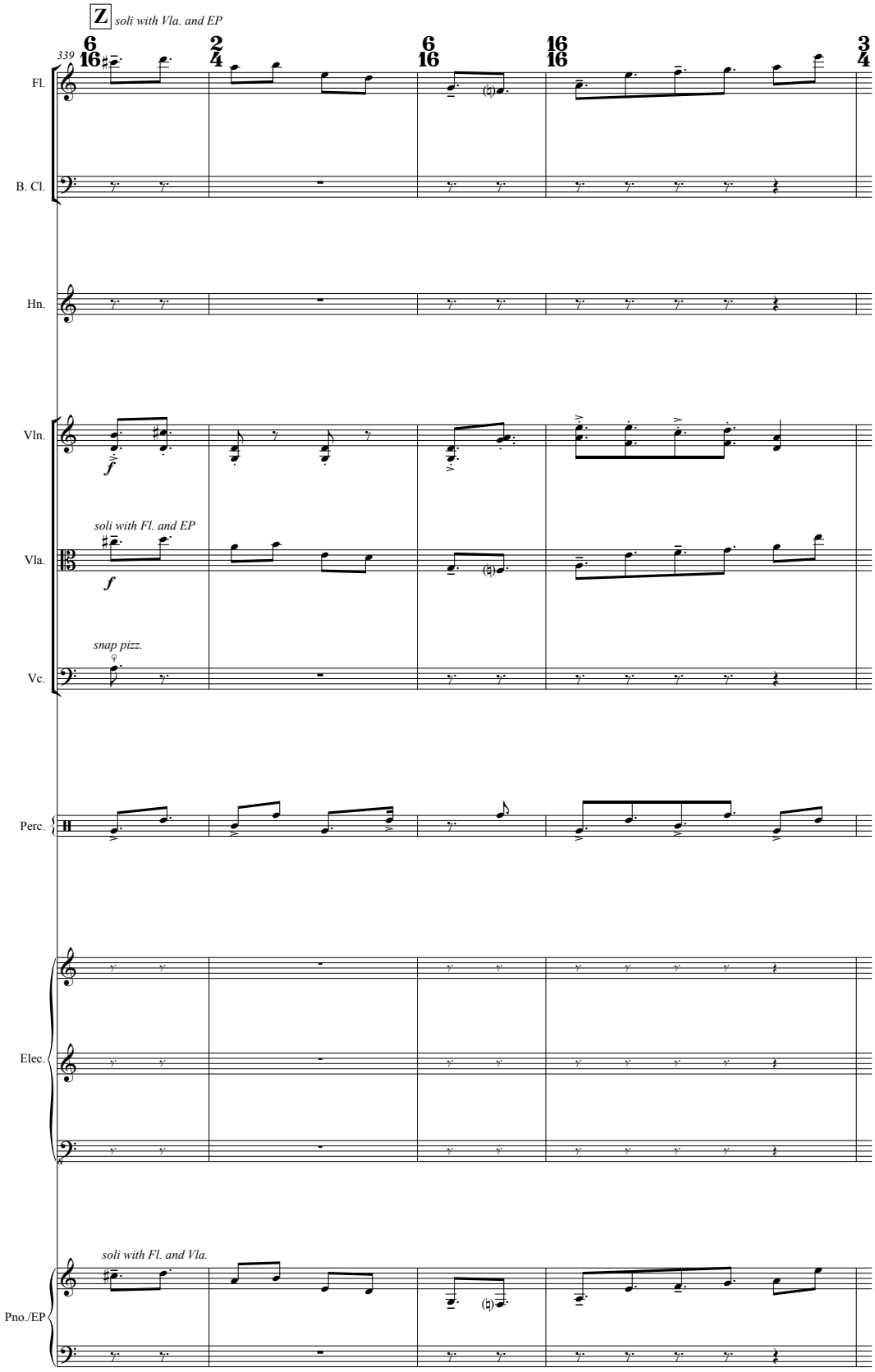

Y BACK TO ORIGINAL FEEL FROM "N"
319
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
(arco)
Perc.
REVERSE ACOUSTIC PIANO (8vb):
Elec.
(SYNTH BASS)
Pno./EP

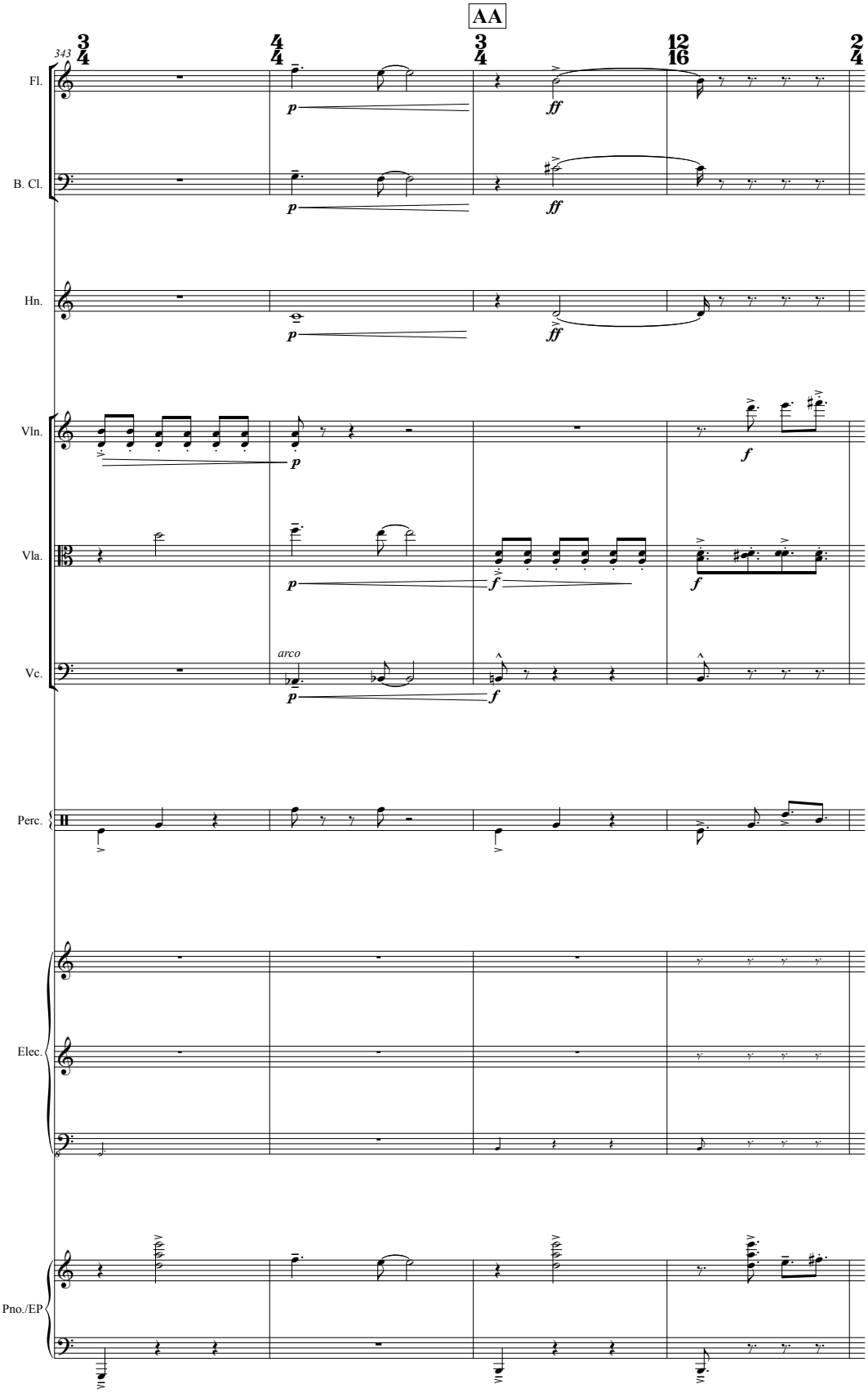

323
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
snap pizz.
arco
snap pizz.
arco
Perc.
Elec.
Pno./EP

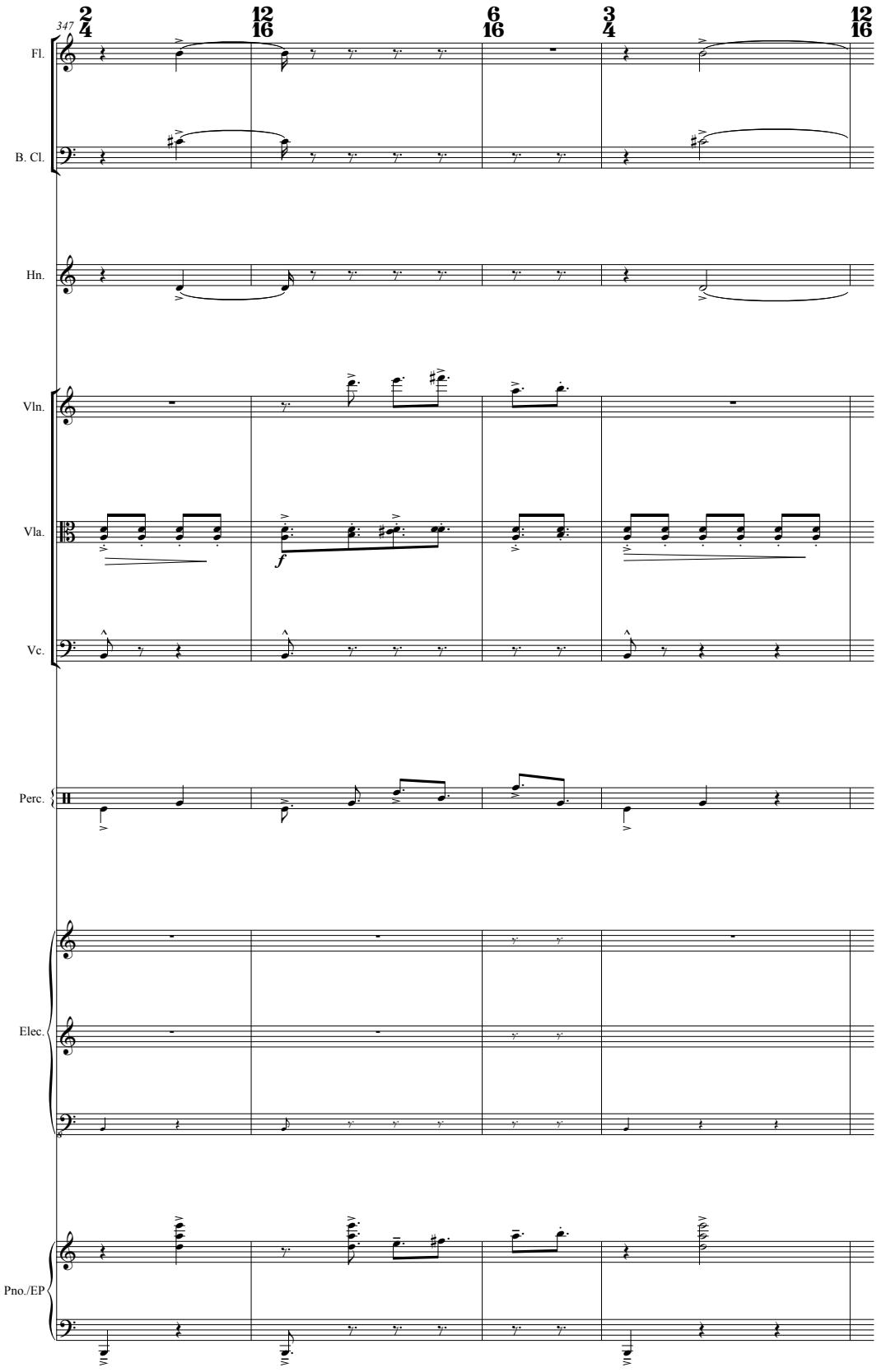

327
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
snap pizz.
arco
snap pizz.

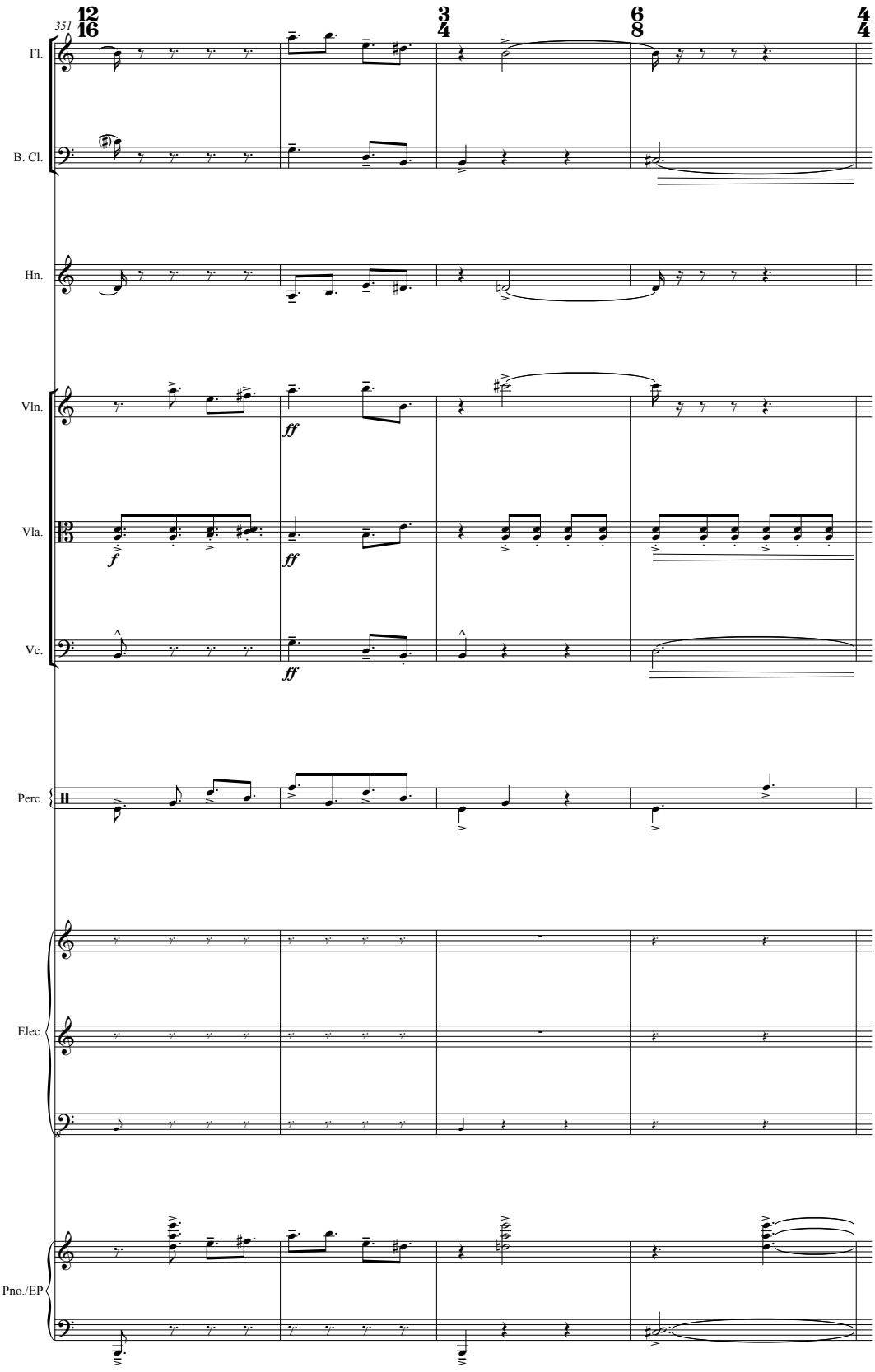

331
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
arco
snap pizz.
arco
f
f
f

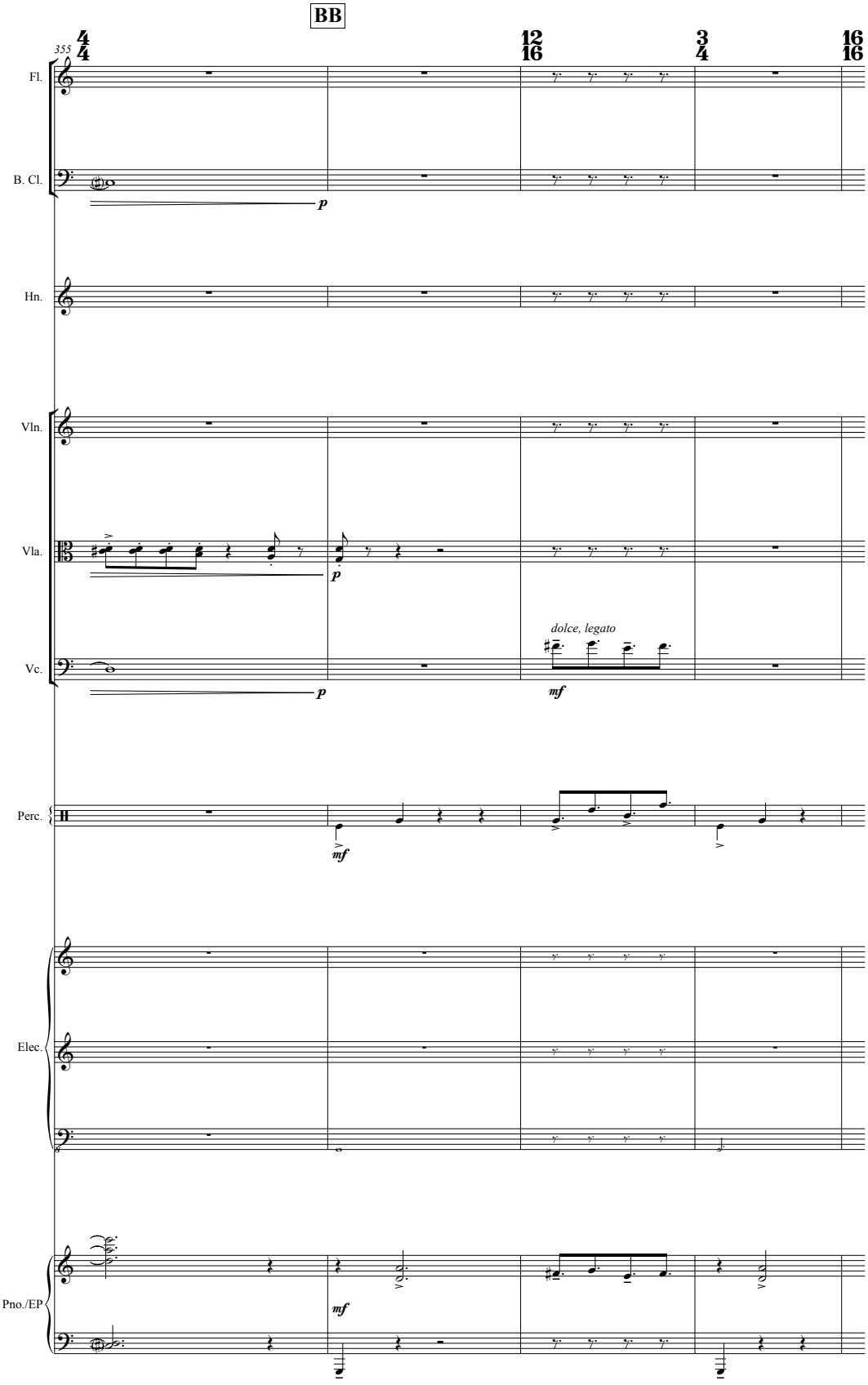

335
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
snap pizz.
arco
snap pizz.
arco
Perc.
Elec.
Pno./EP

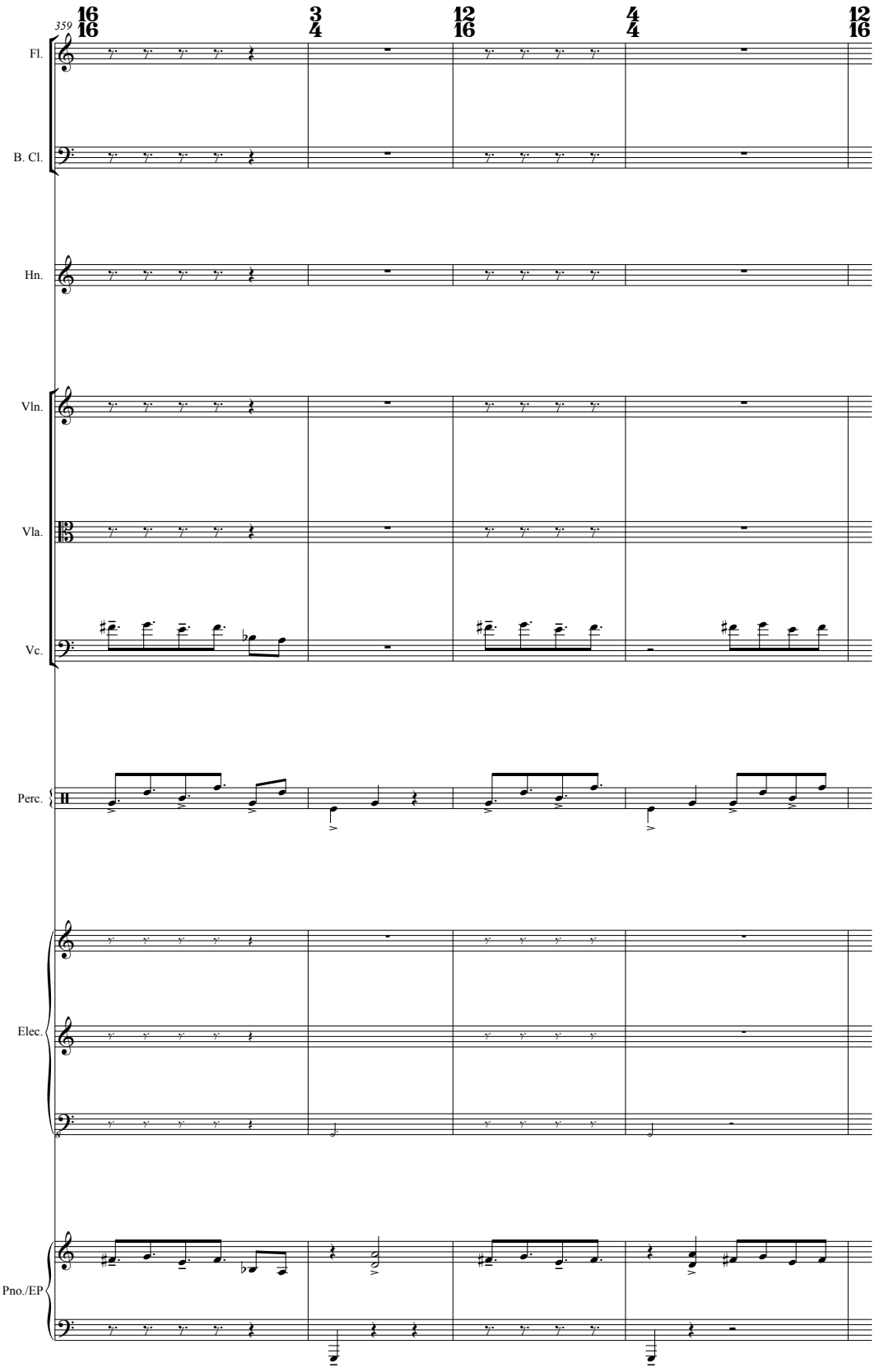

Z soli with Vla. and EP
339
Fl.
B. Cl.
Hn.
Vln.
soli with Fl. and EP
Vla.
snap pizz.
Vc.
Perc.
Elec.
soli with Fl. and Vla.
Pno./EP

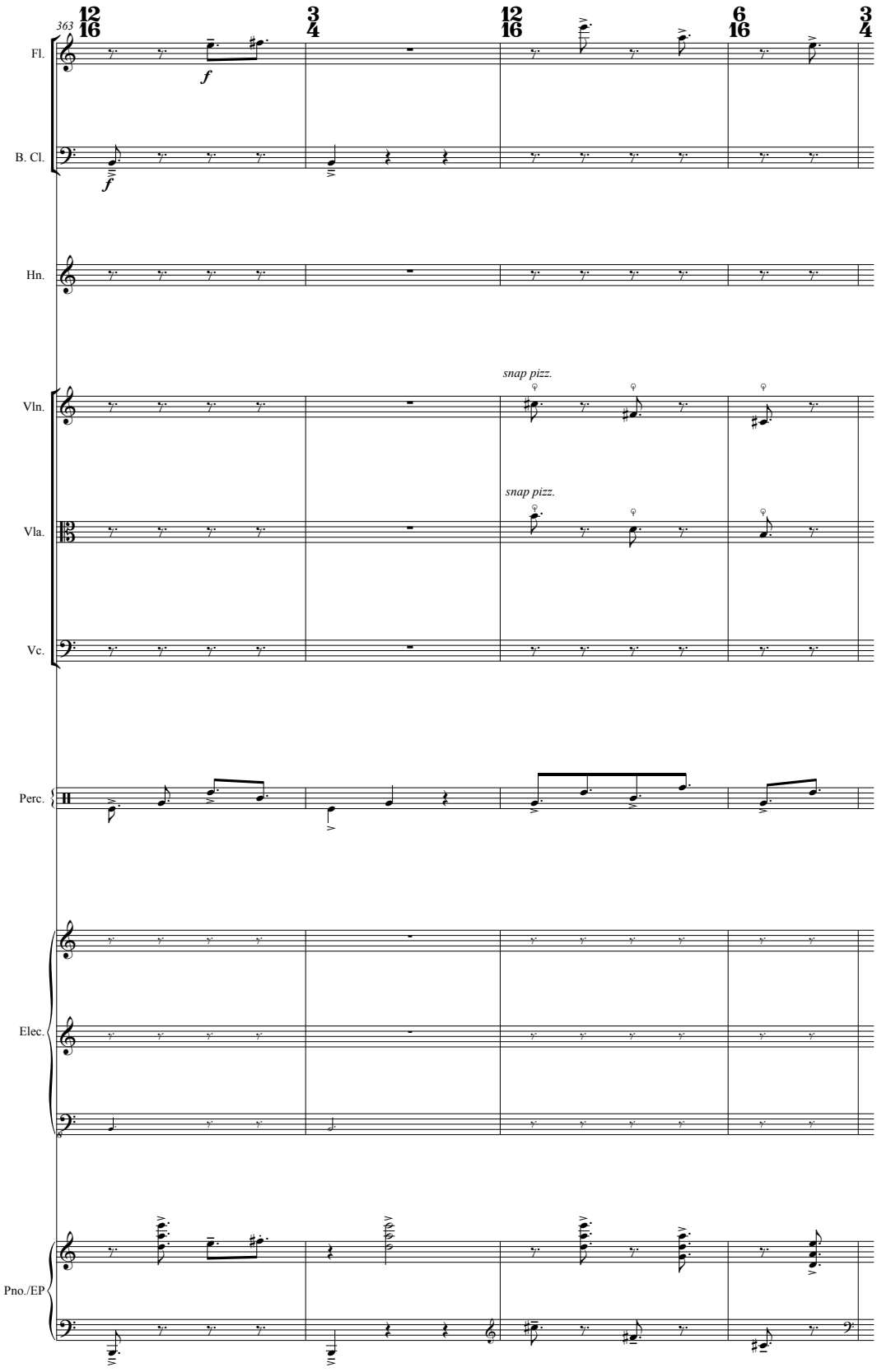

AA
343
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
arco
Perc.
Elec.
Pno./EP

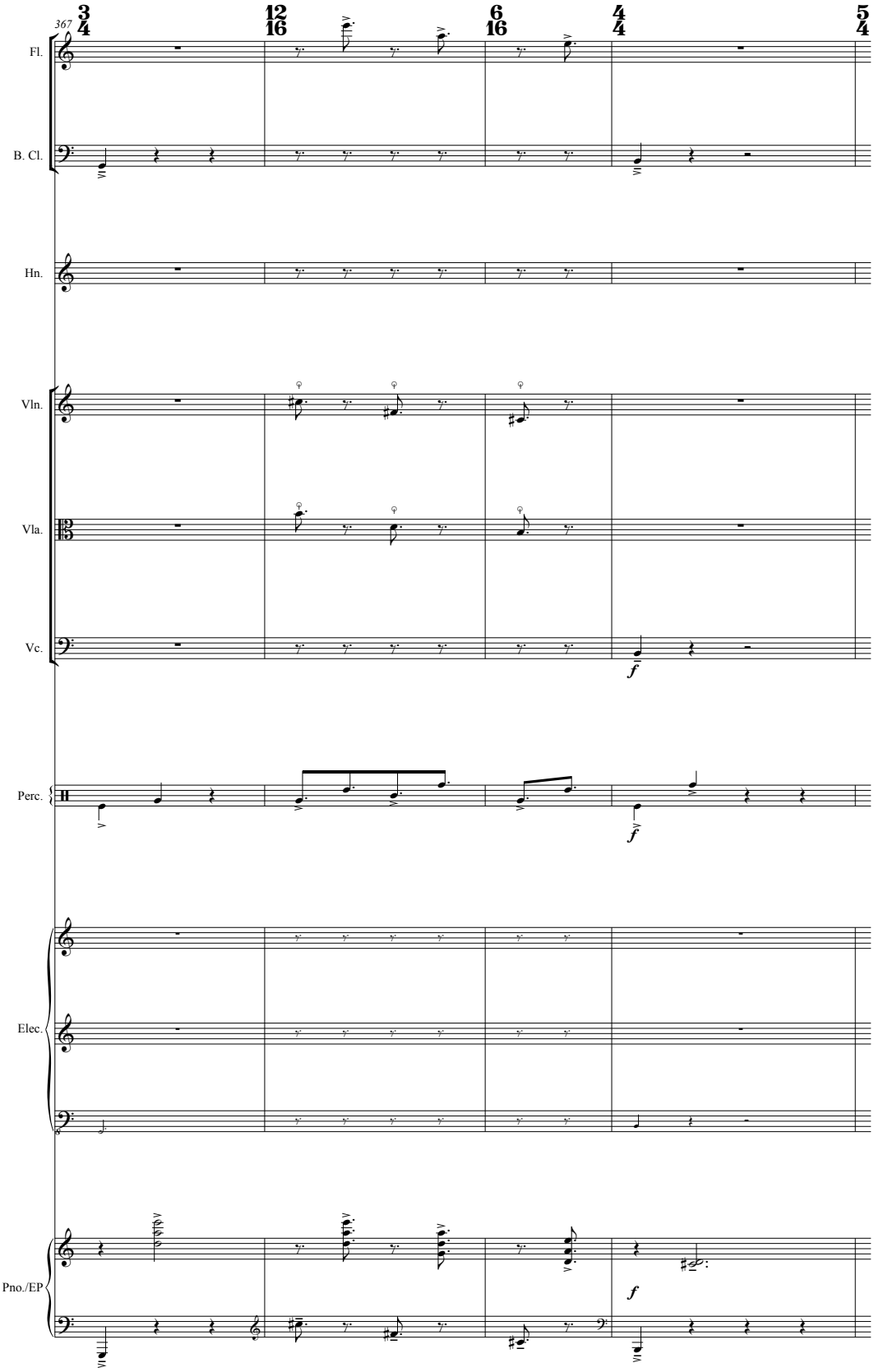

347
2/4
12/16
6/16
3/4
12/16
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

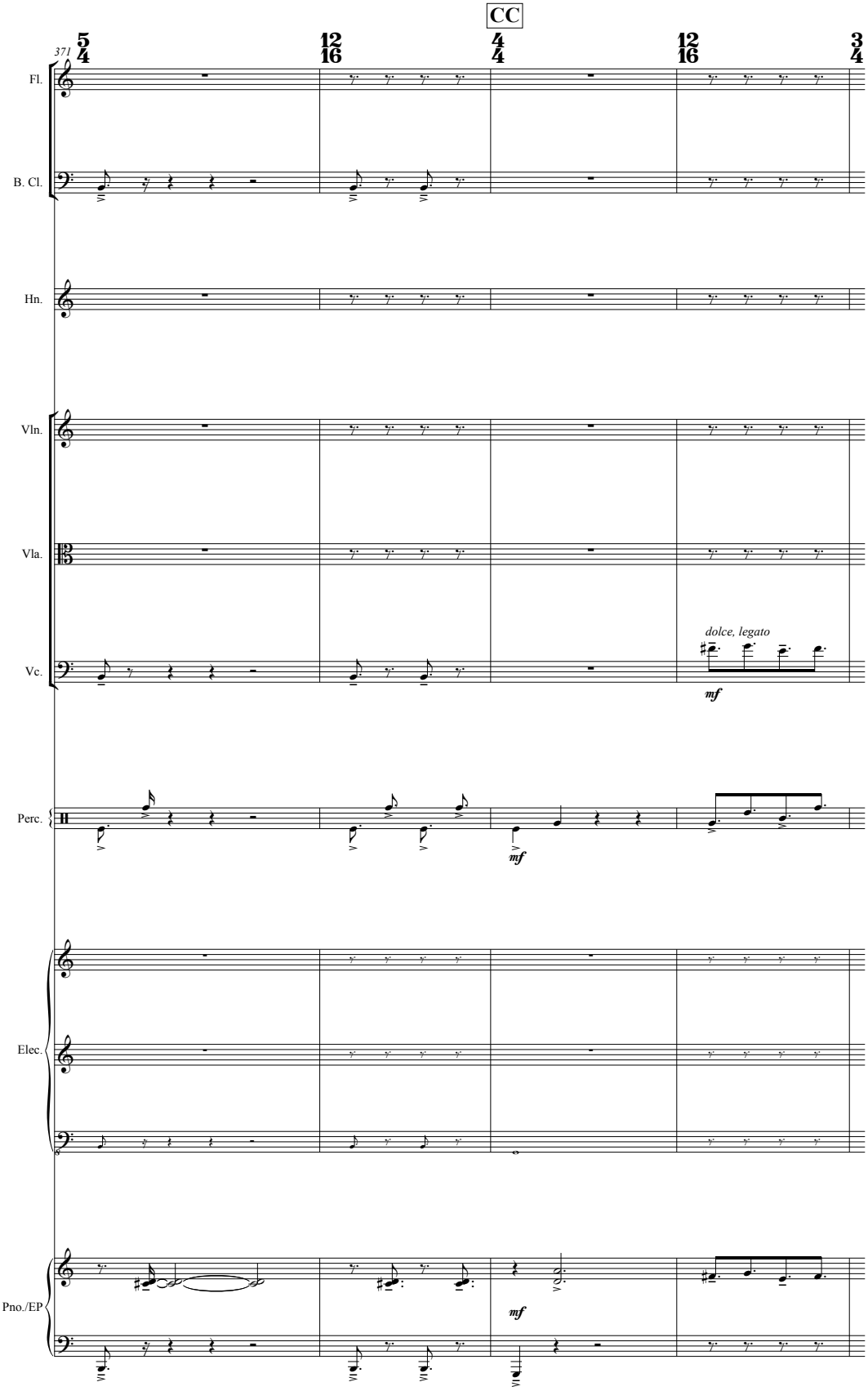

351
12/16
3/4
6/8
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
ff
f
ff
ff

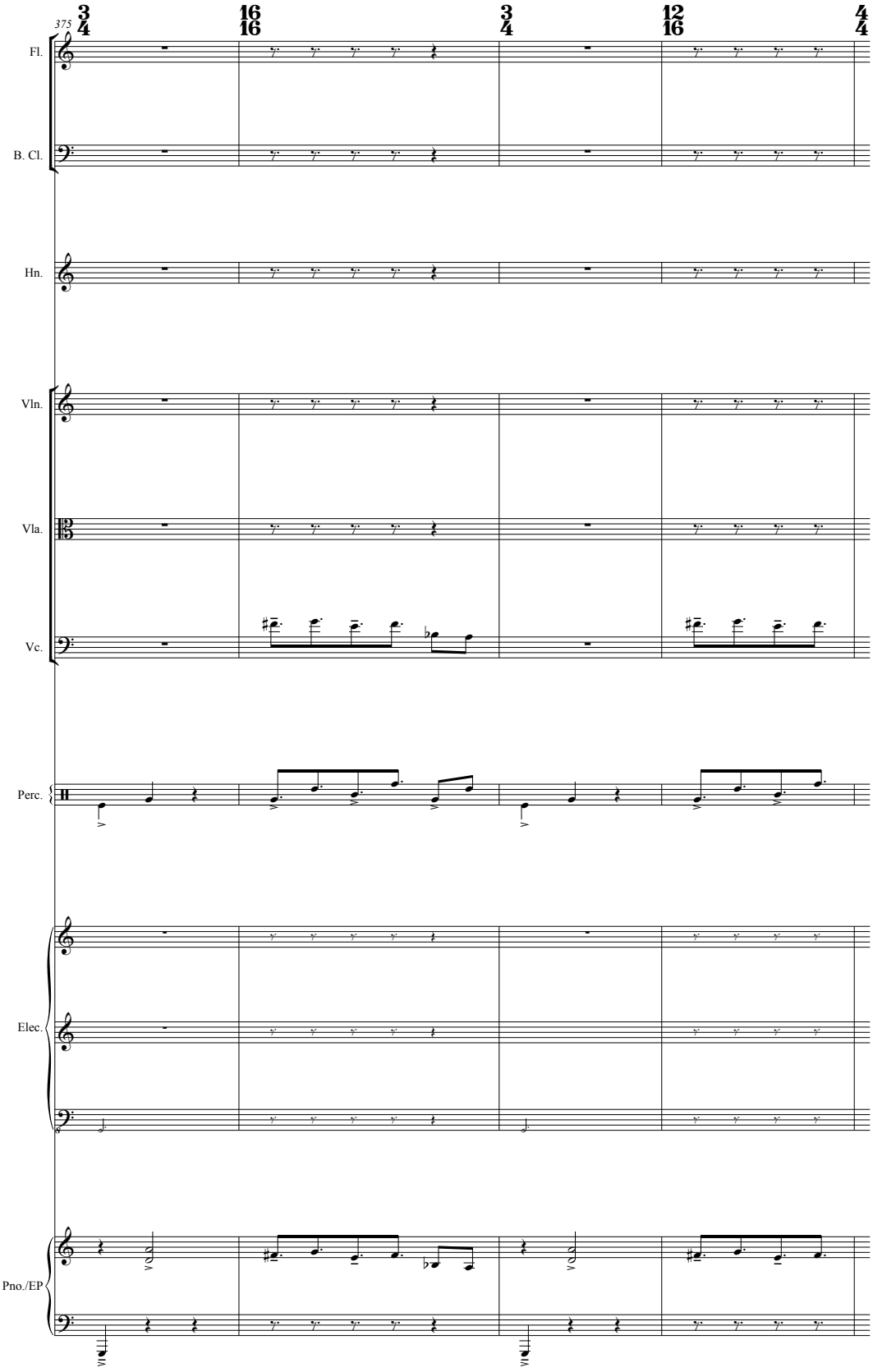

BB
355
4/4
12/16
3/4
16/16
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
p
mf
dolce, legato

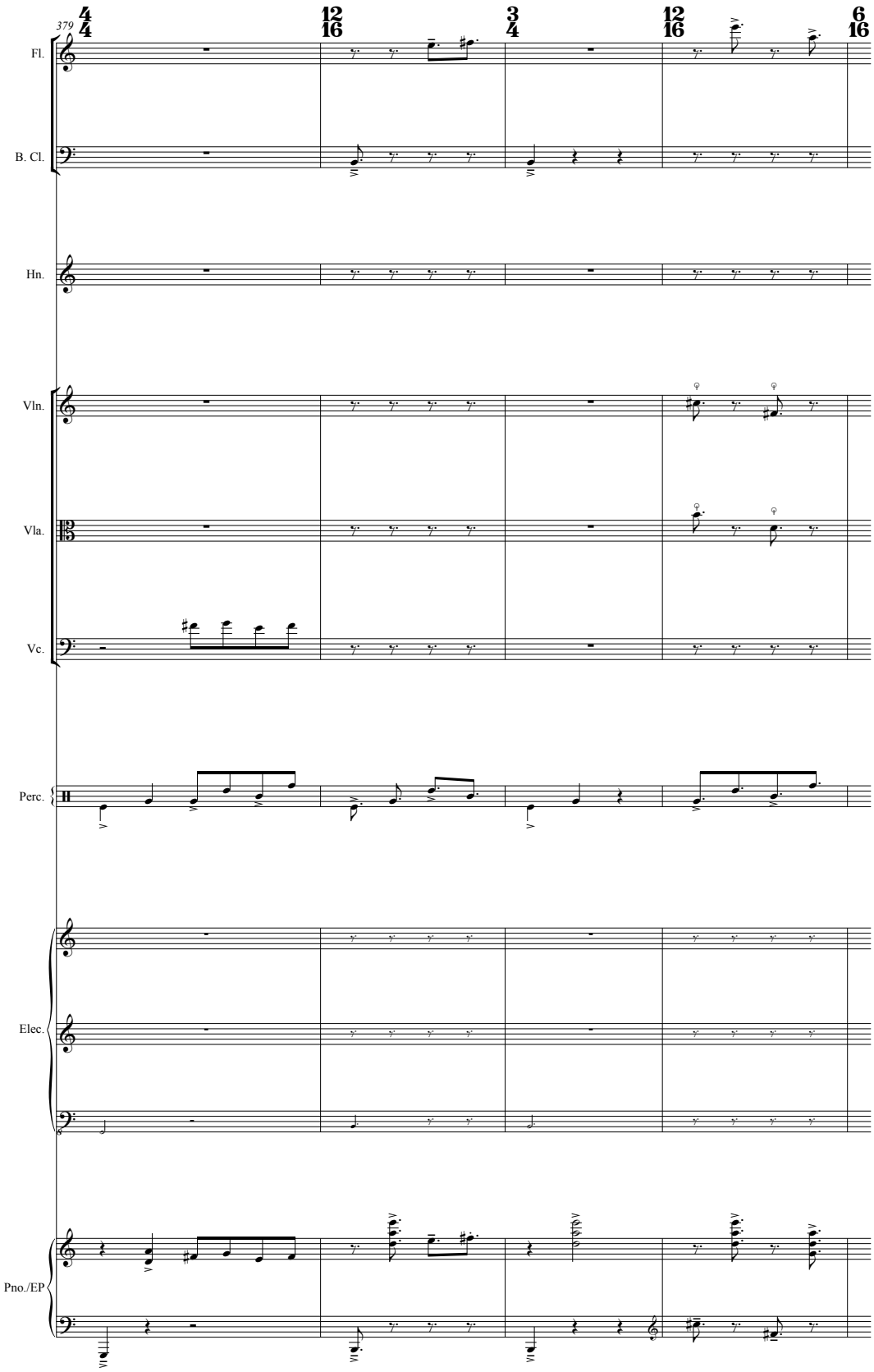

359
16/16
3/4
12/16
4/4
12/16
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP

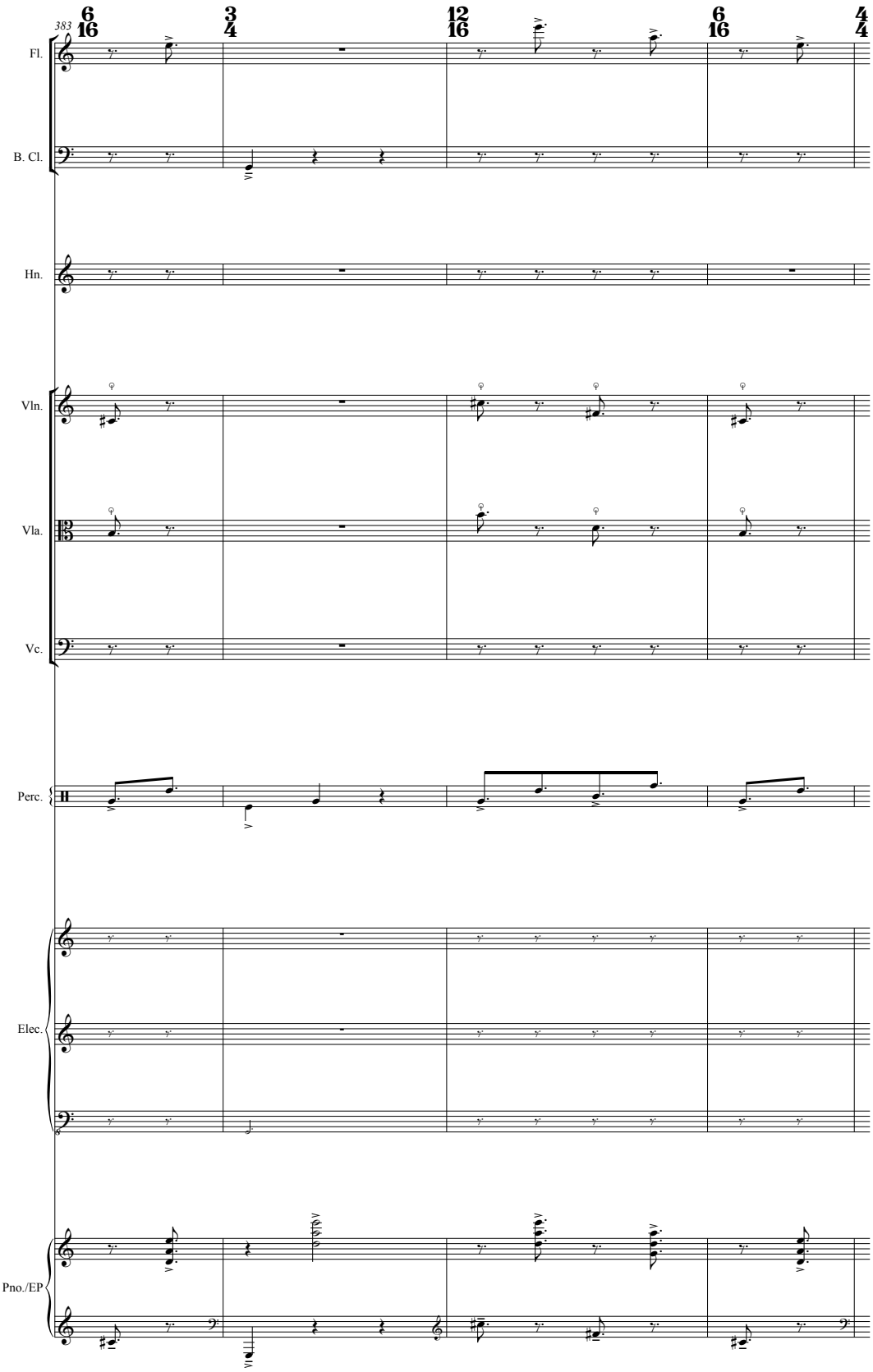

363
12/16
3/4
12/16
6/16
3/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
f
snap pizz.
snap pizz.

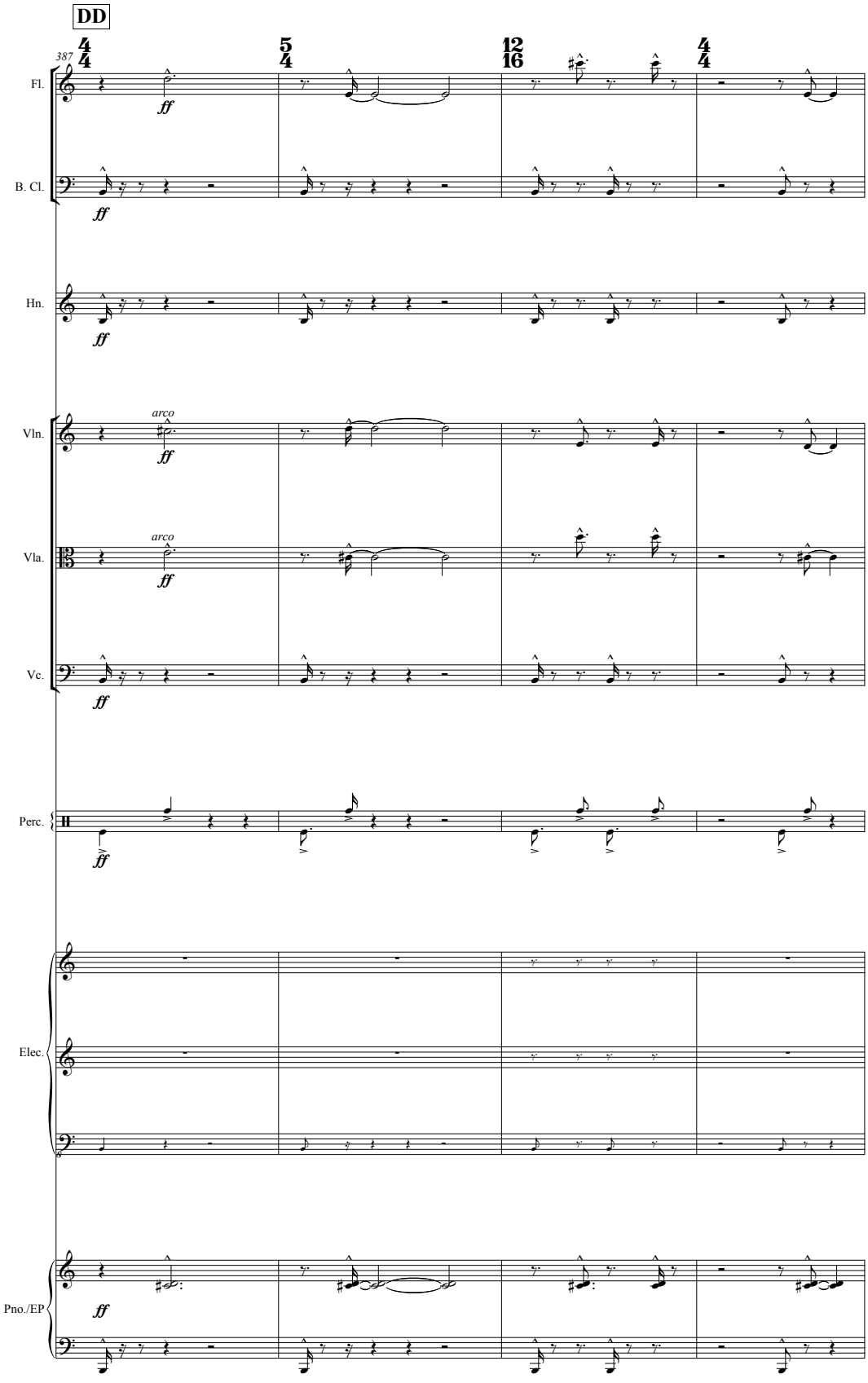

367
3/4
12/16
6/16
4/4
5/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
f
f
f

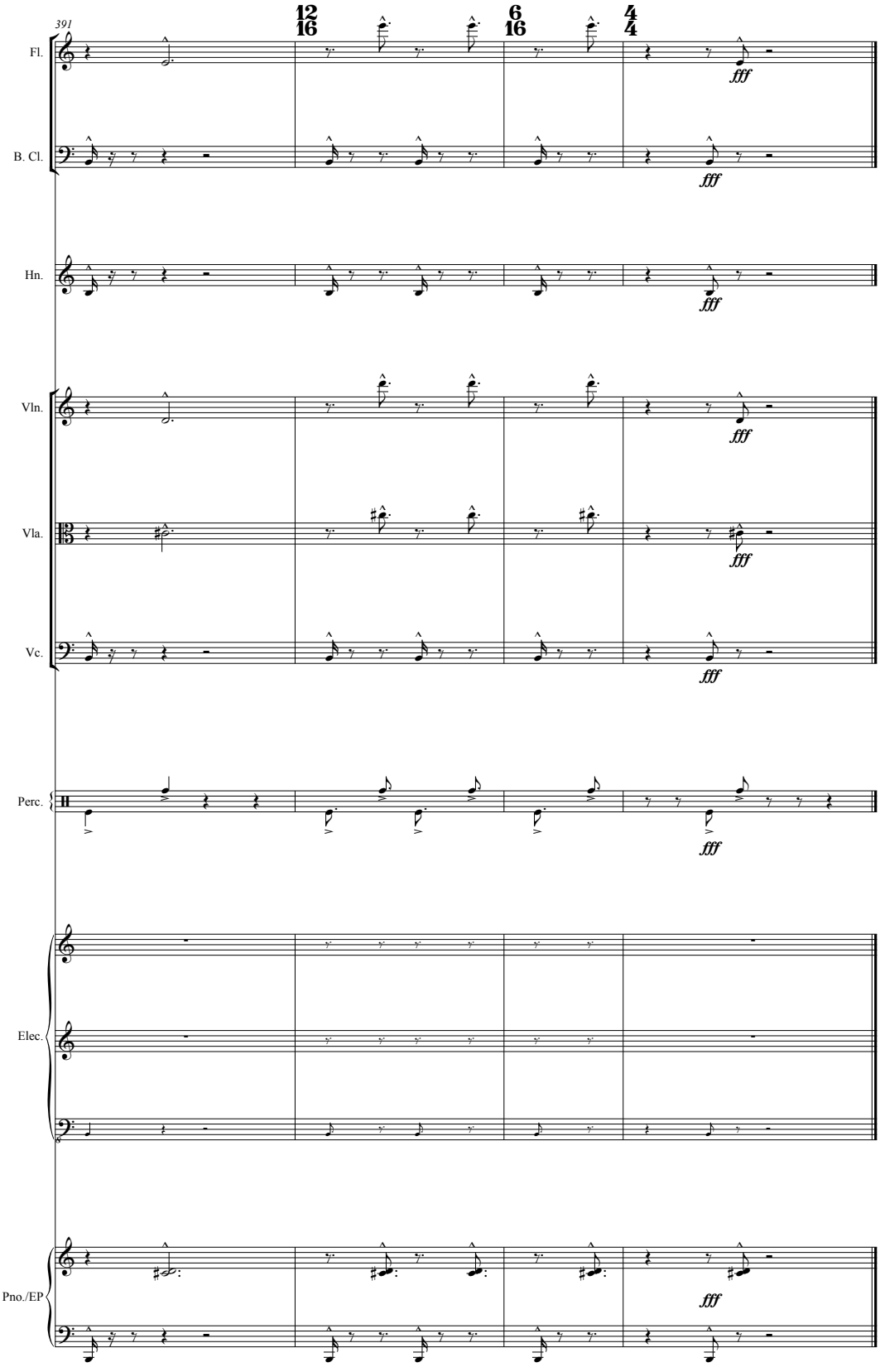

CC
371
5/4
12/16
4/4
12/16
3/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
dolce, legato
mf
Perc.
mf
Elec.
Pno./EP
mf


375
3/4
16/16
3/4
12/16
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP


379
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP


383
6/16
3/4
12/16
6/16
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP


DD
387
4/4
5/4
12/16
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
ff
arco


391
12/16
6/16
4/4
Fl.
B. Cl.
Hn.
Vln.
Vla.
Vc.
Perc.
Elec.
Pno./EP
fff

BIBLIOGRAPHY

Johnson, Tom. *Self-Similar Melodies.* Paris: Editions 75, 1996.

Laurello, Michael. "The Disincorporation of Four Towns." Unpublished score, 2011.

Meshuggah. *Chaosphere.* Nuclear Blast GmbH, 1998, AAC audio files.

———. *Nothing.* Nuclear Blast GmbH, 2002, AAC audio files.

———. *obZen.* Nuclear Blast GmbH, 2008, AAC audio files.

Nancarrow, Conlon. *Collected Studies for Player Piano Vol. 3*. Santa Fe: Soundings Press, 1982.

———. *Collected Studies for Player Piano Vol. 4.* Santa Fe: Soundings Press, 1983.

———. *Collected Studies for Player Piano Vol. 6*. Santa Fe: Soundings Press, 1985.