Composition Research Folio

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Submitted in fulfilment of the requirements of the degree of
Mmus (Composition)

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Abstract

This folio consists of 2 works for contrasting chamber ensembles and supporting research papers. Scores appear in chronological order according to their completion date in order to highlight the development of ideas. Research papers explore aspects of listening, aleatoricism, spectromorphological analysis, methodology and compositional process, and concepts of space in Varese's *Ionisation* and in these compositions.

Contents

Hothouses Bloom

For Harp, Soprano, Celesta and Harmonium

Claire Docherty

Soprano part

 = Tongue click – make this sound by tutting with the tongue just behind the tooth ridge and then immediately slapping the tongue against the floor of the mouth.

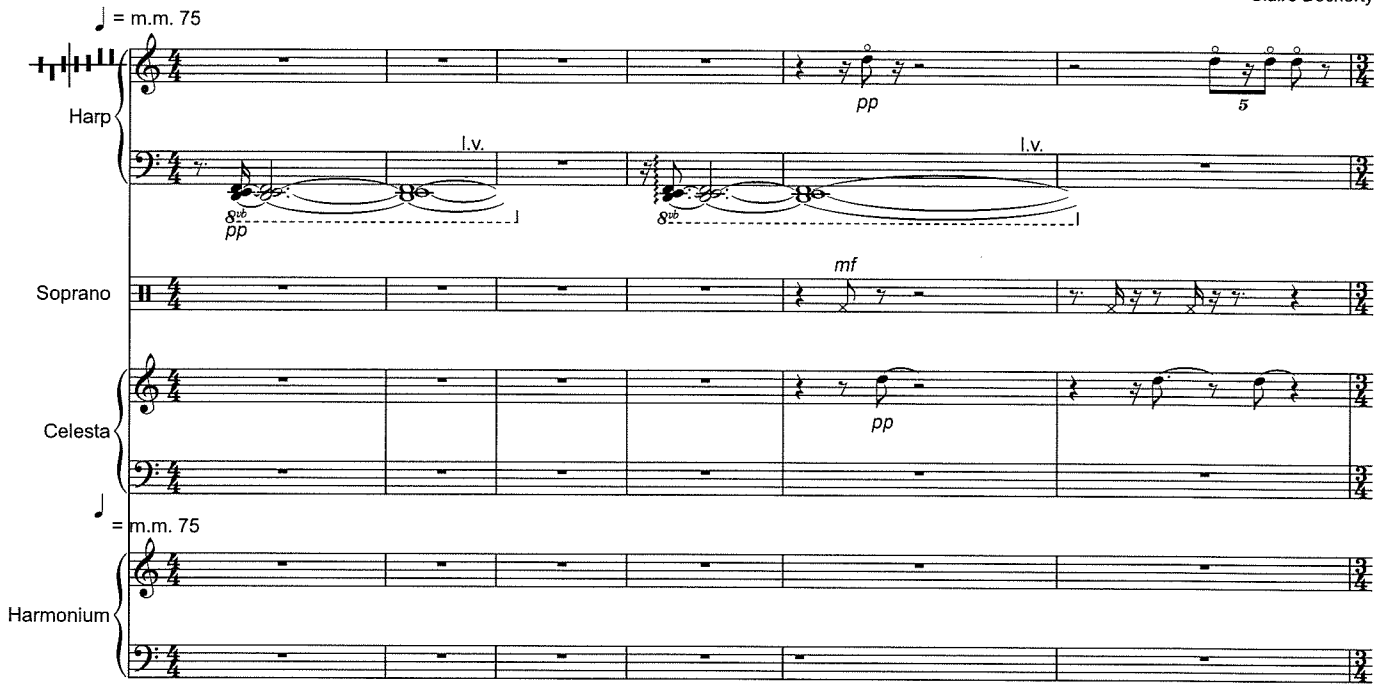
Harp part

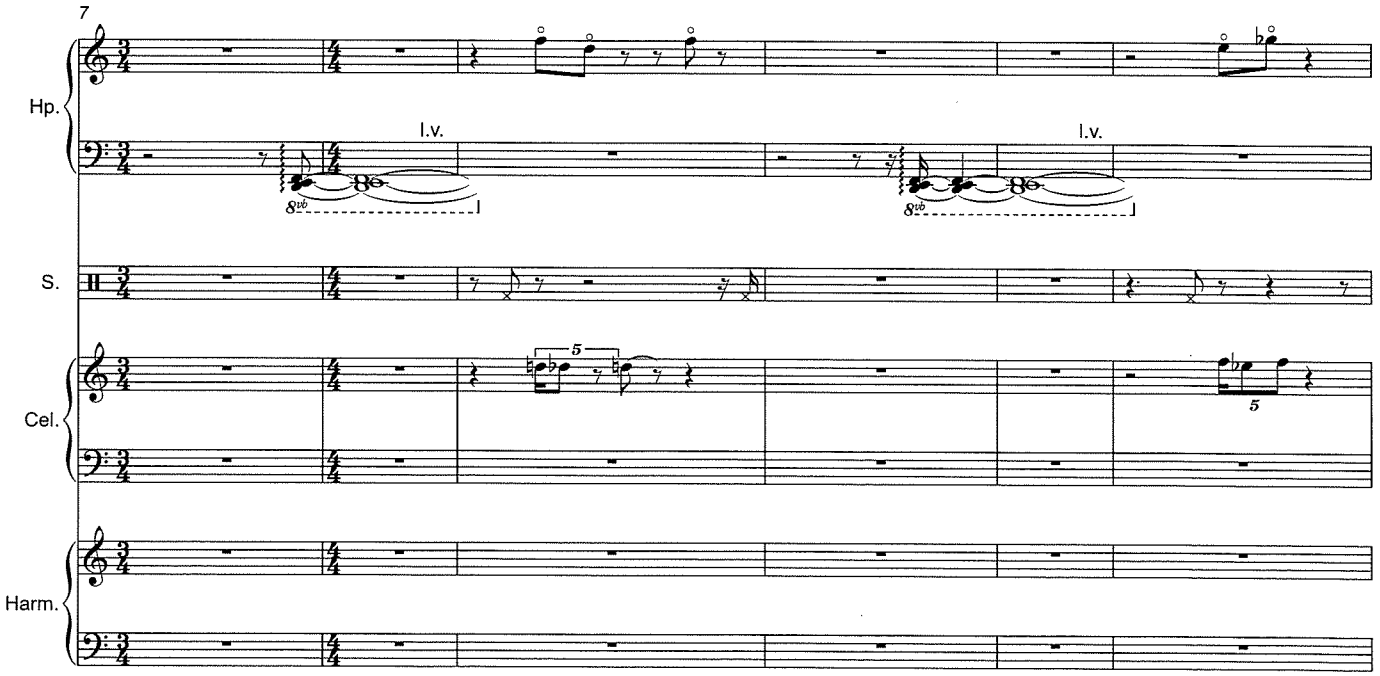
 = Strike the body of the instrument with knuckles.

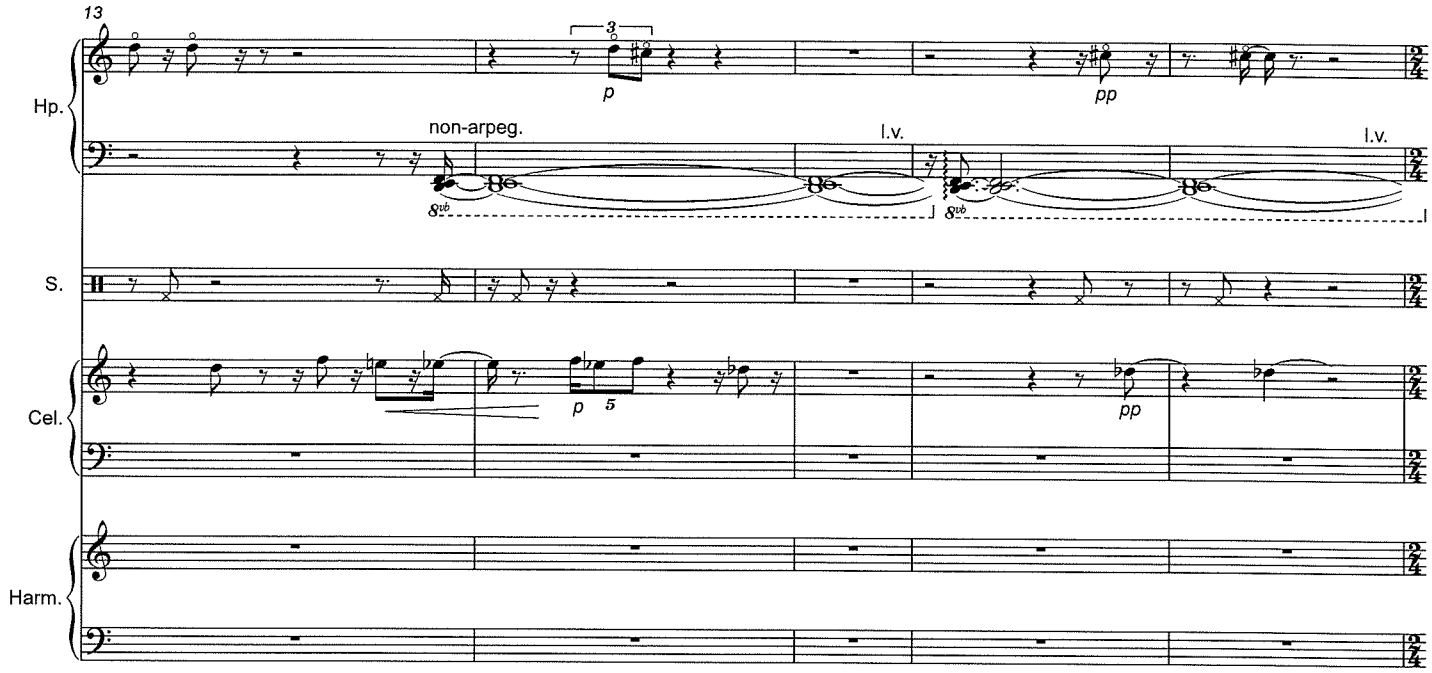
 = Strong glissando using 2nd finger of the right hand letting the strings rattle against one another.

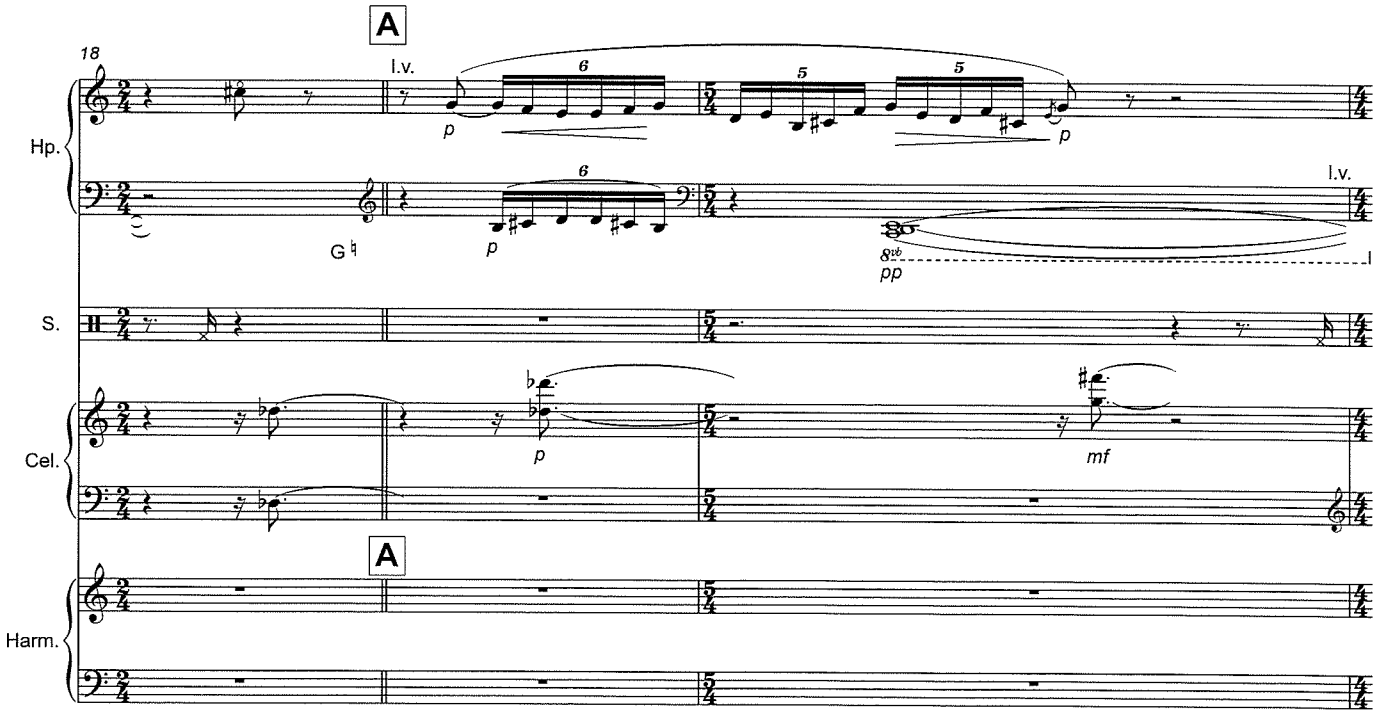
Hothouses Bloom

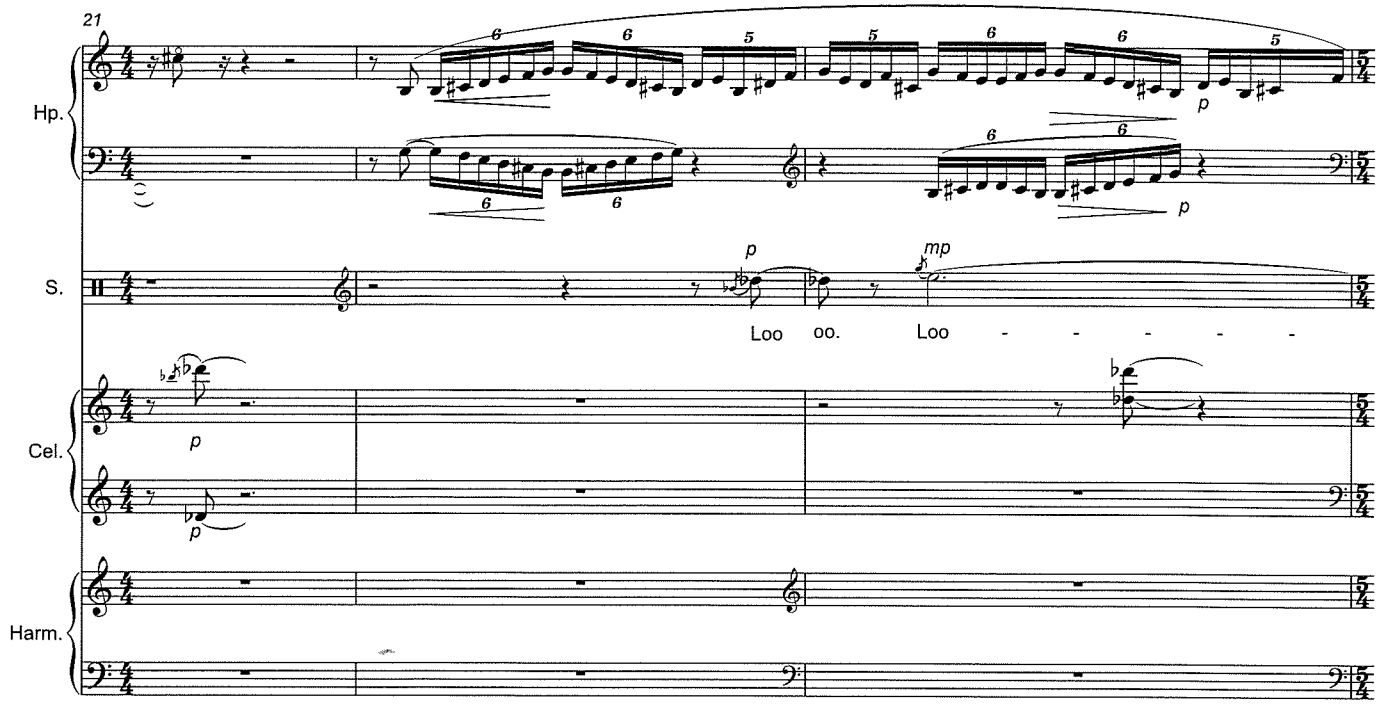
Claire Docherty

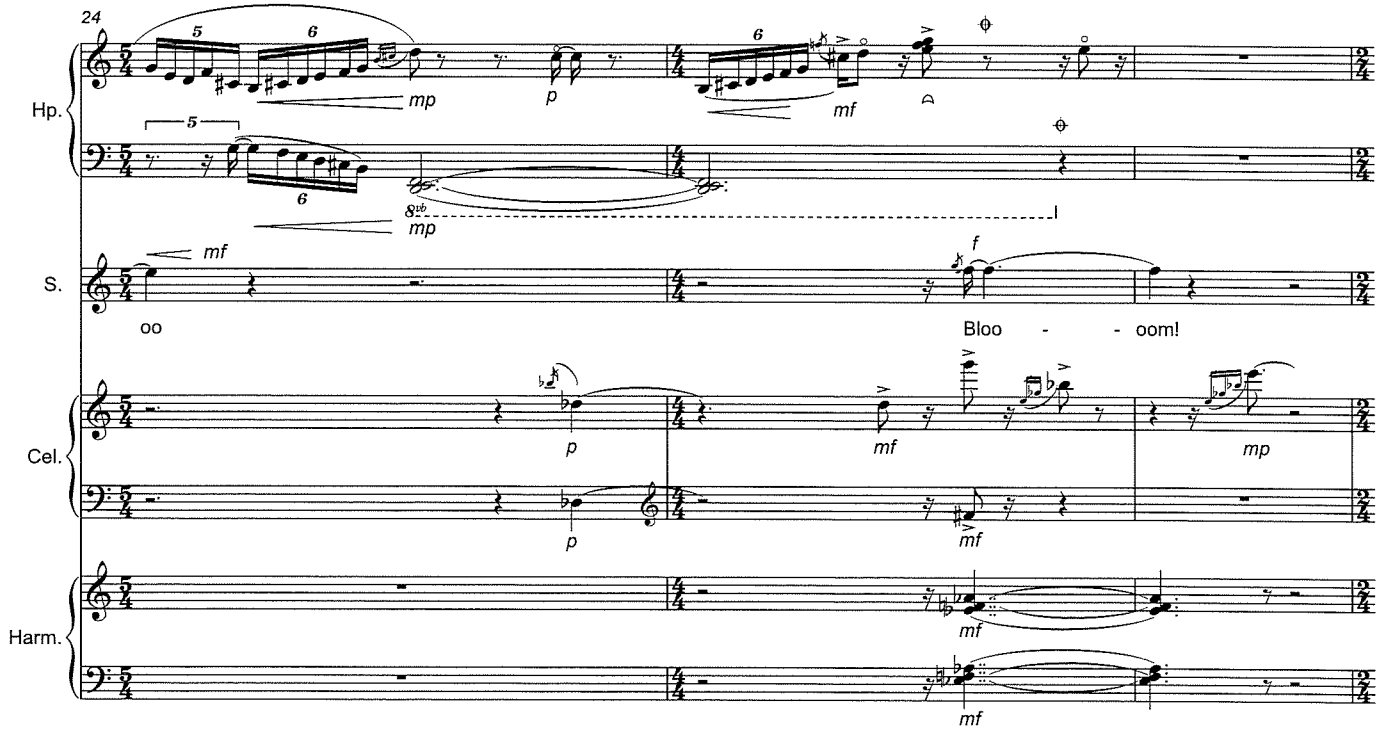


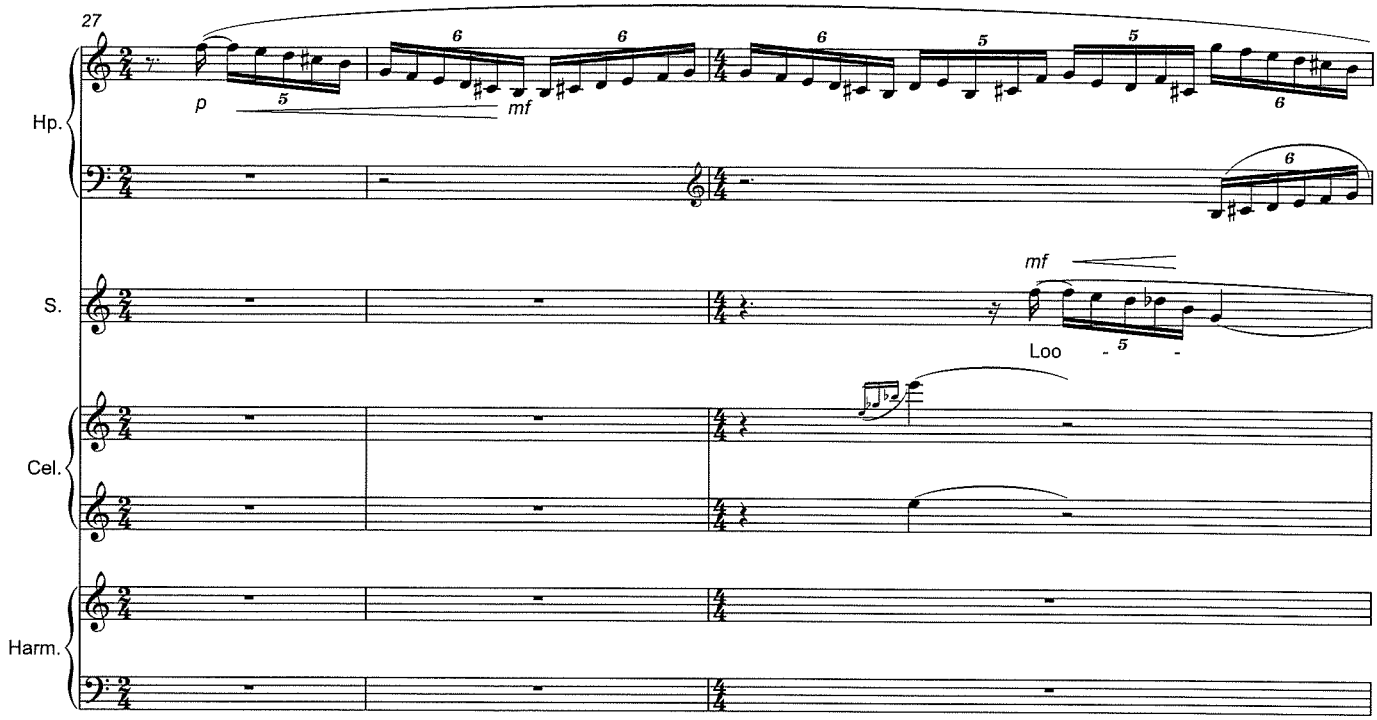


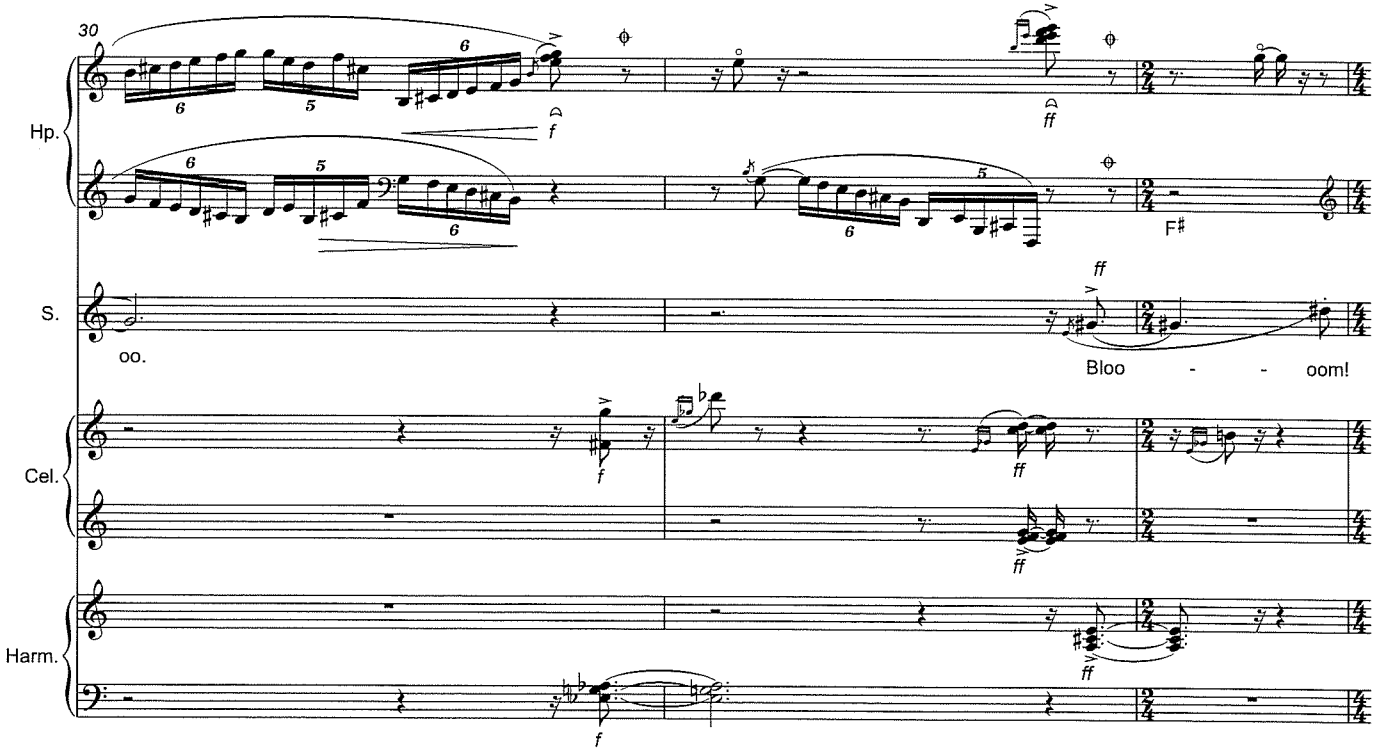

13
Hp.
S.
Cel.
Harm.
non-arpeg.
l.v.
l.v.
l.v.
p
pp
p
pp

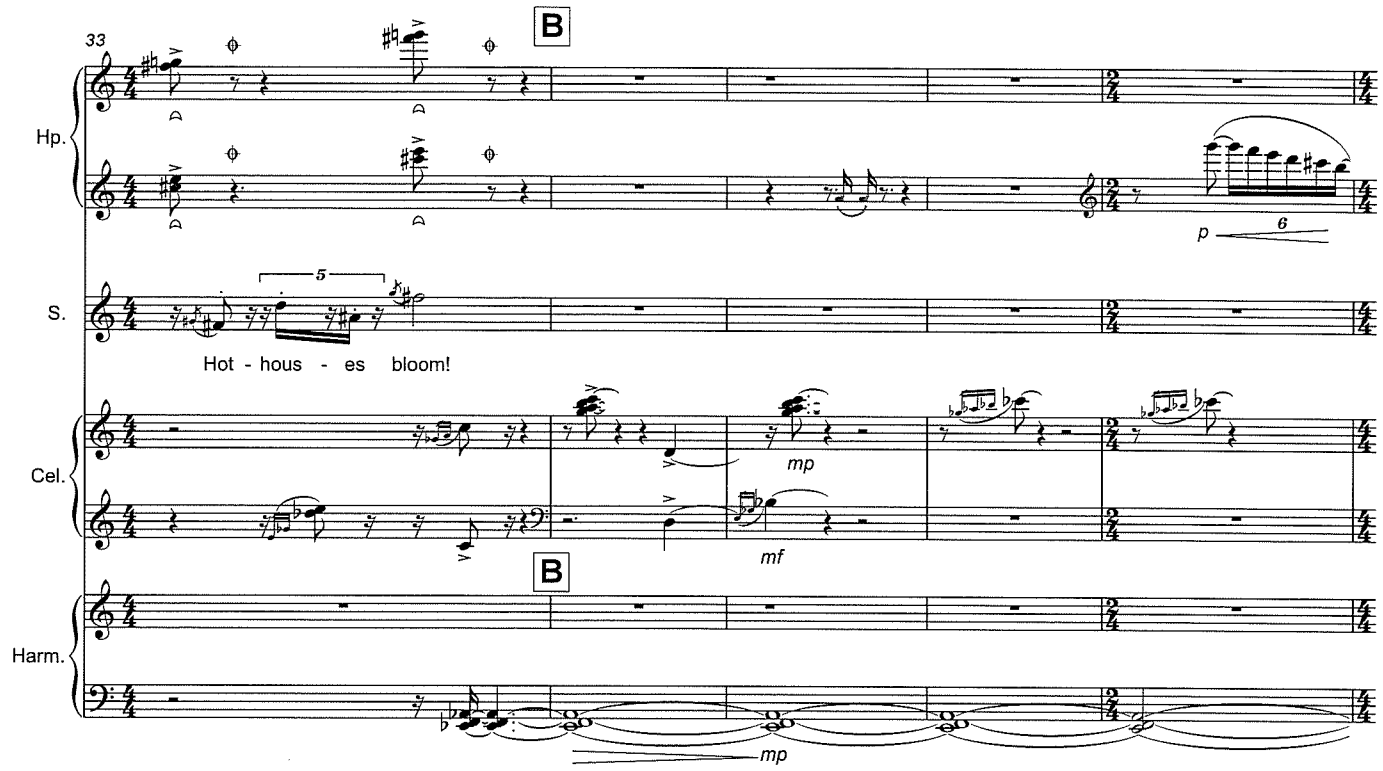

A
18
Hp.
S.
Cel.
Harm.
l.v.
p
p
G
p
l.v.
8vb
pp
p
mf
A

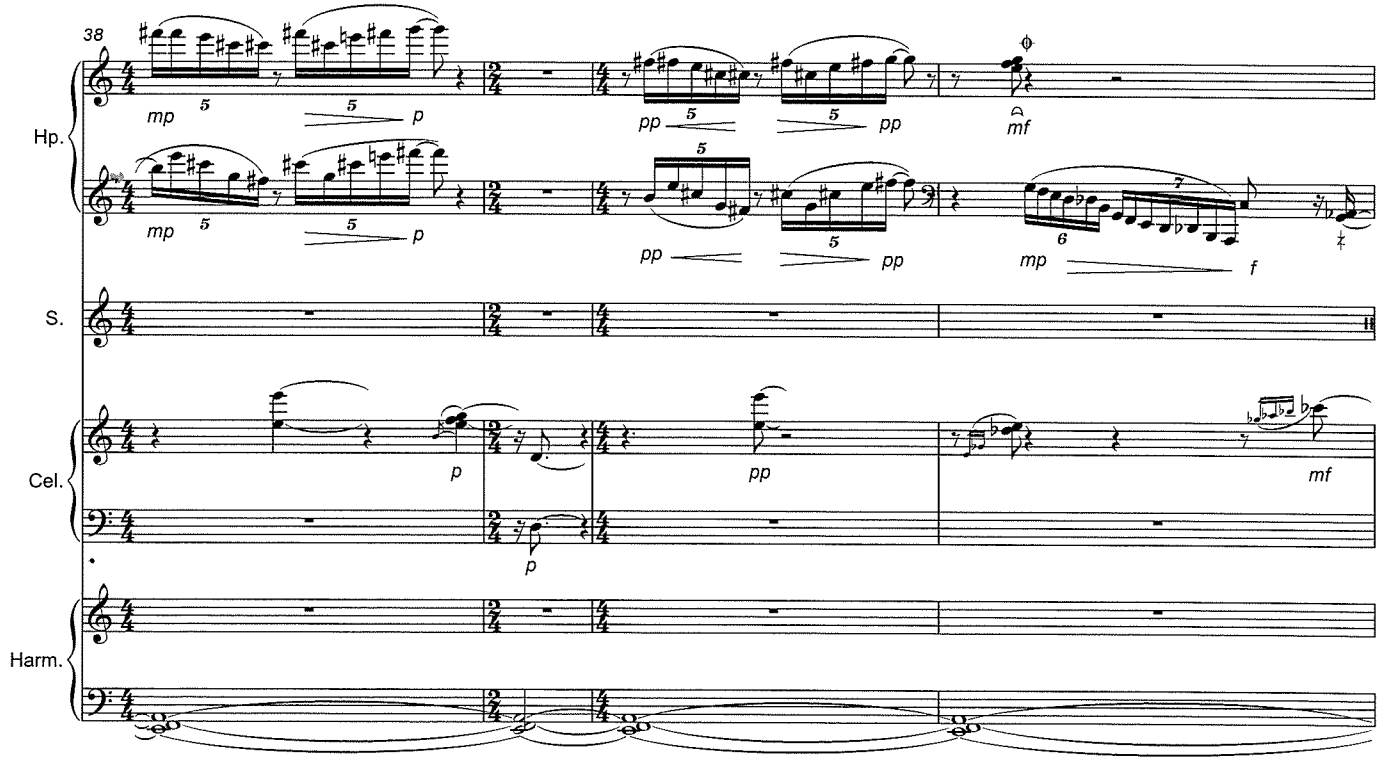

21
Hp.
S.
Loo oo. Loo - - - - -
Cel.
Harm.

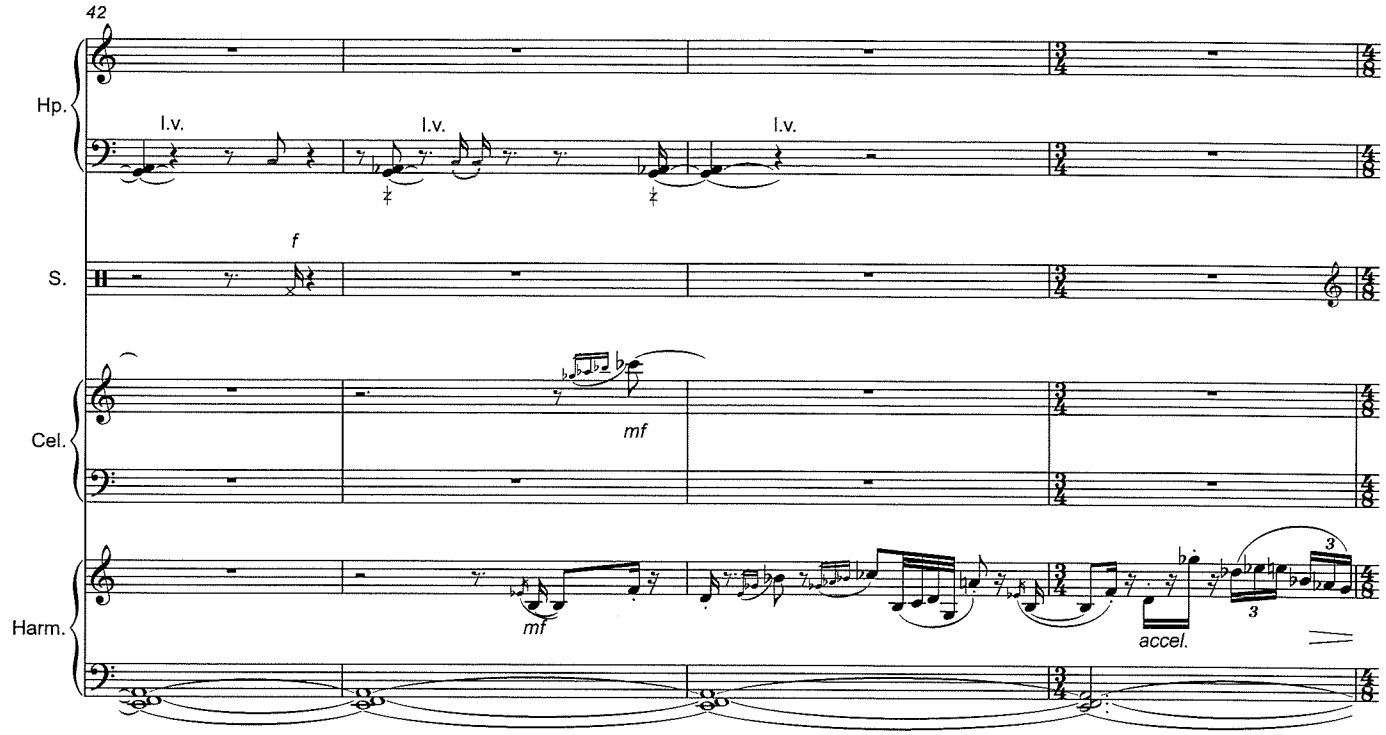

24
Hp.
S.
oo
Bloo - - oom!
Cel.
Harm.

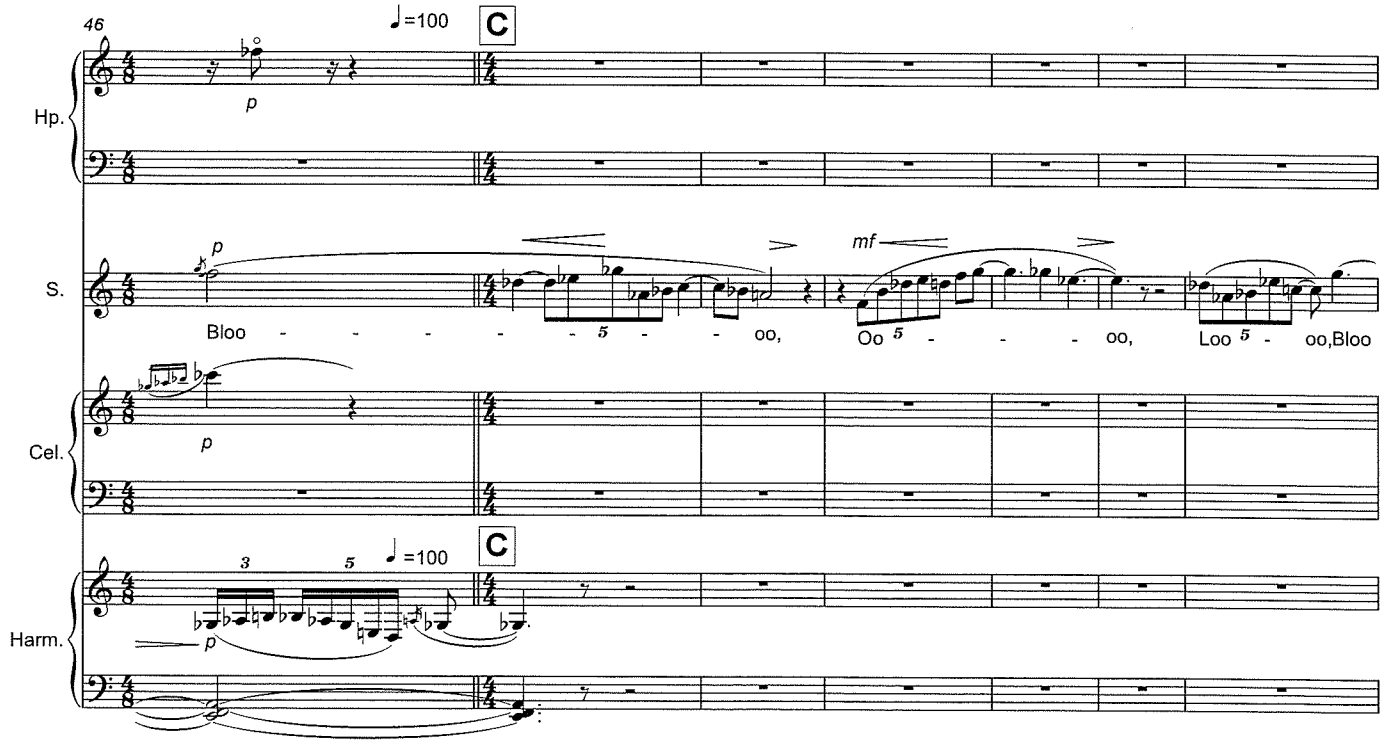

27
Hp.
S.
Cel.
Harm.
p
mf
Loo - -

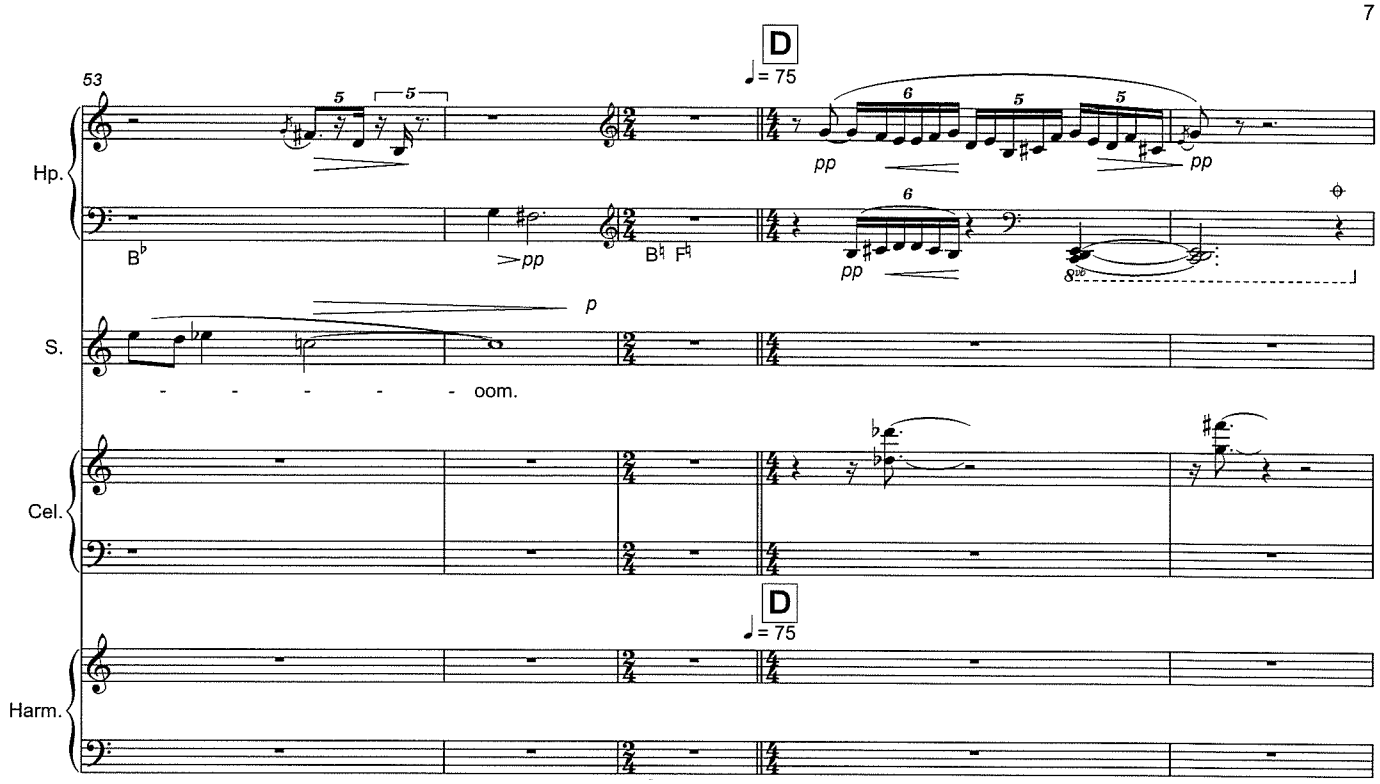

30
Hp.
S.
Cel.
Harm.
f
ff
F♯
oo.
Bloo - - oom!

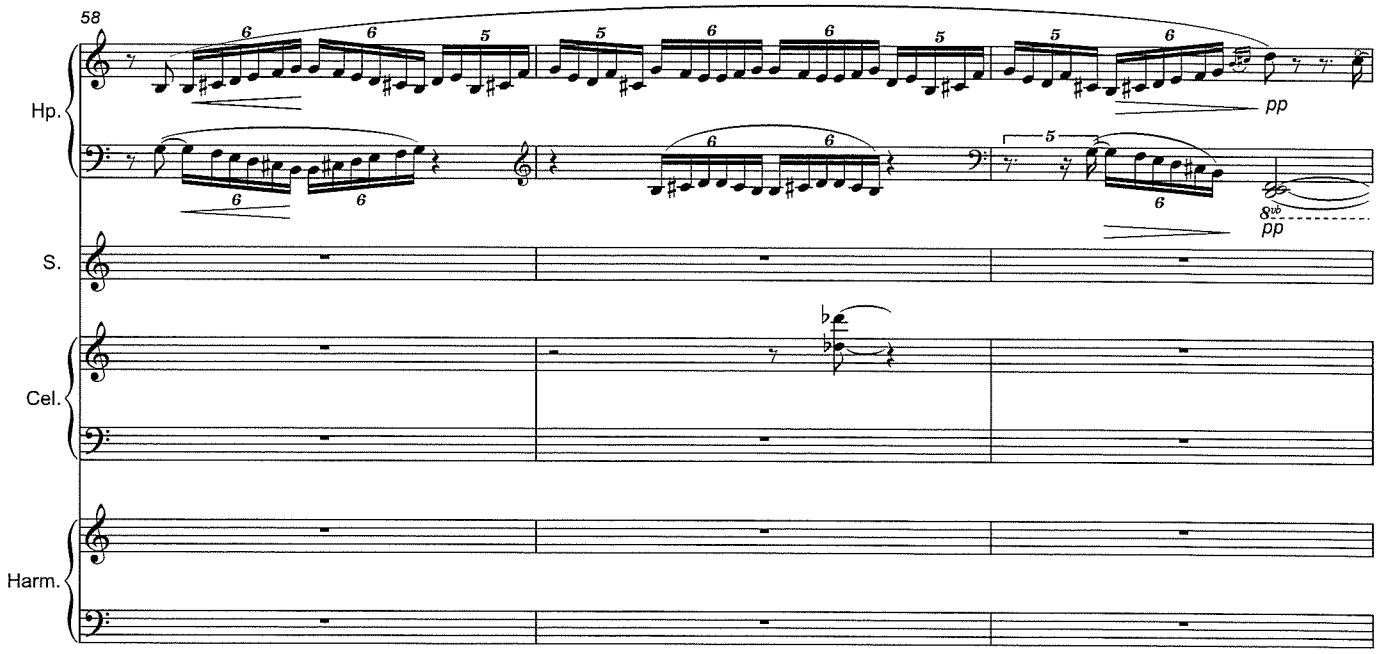

33
B
Hp.
S.
Hot - hous - es bloom!
Cel.
Harm.
p
mp
mf
B
mp

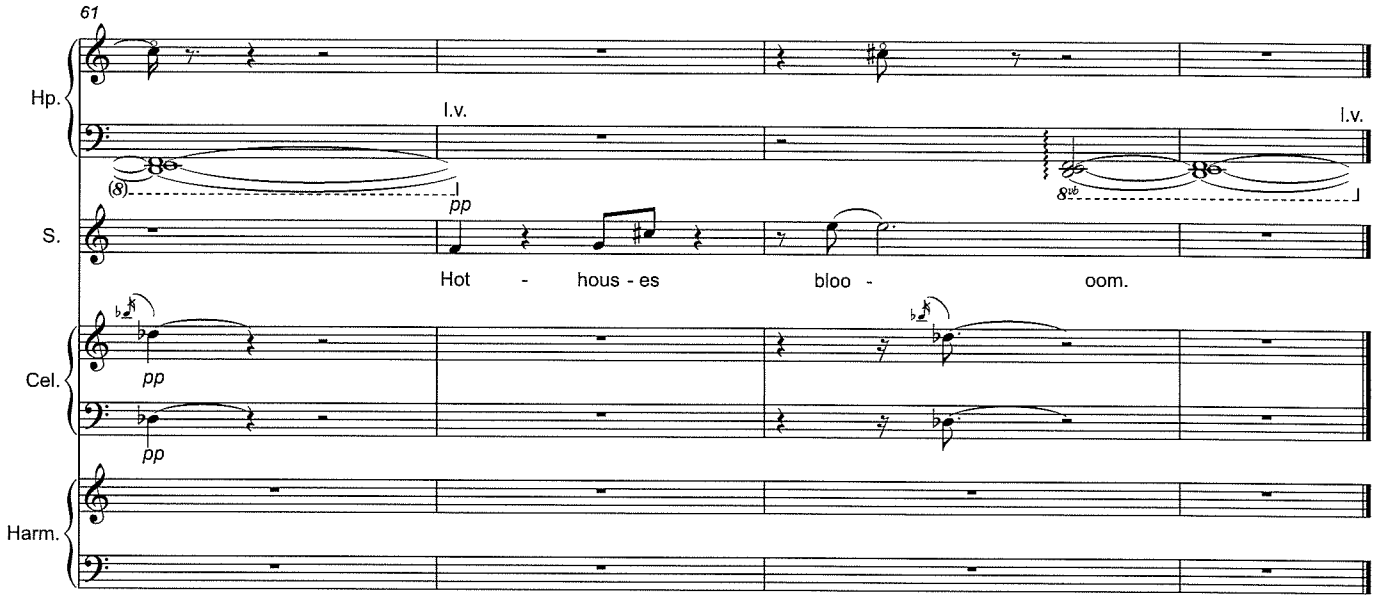

38
Hp.
mp
p
pp
mf
S.
Cel.
Harm.
f


42
Hp.
l.v.
l.v.
l.v.
S.
f
Cel.
mf
Harm.
mf
accel.


46
♩=100
C
Hp.
p
S.
p
Bloo - - - - - 5 - - oo,
mf
Oo 5 - - - oo,
Loo 5 - oo,Bloo
Cel.
p
Harm.
3
5
♩=100
C
p


53
D
♩= 75
Hp.
S.
oom.
Cel.
Harm.
pp
p


58
Hp.
S.
Cel.
Harm.
pp


61
Hp.
l.v.
l.v.
(8)
8vb
pp
S.
Hot - hous - es bloo - oom.
Cel.
pp
pp
Harm.

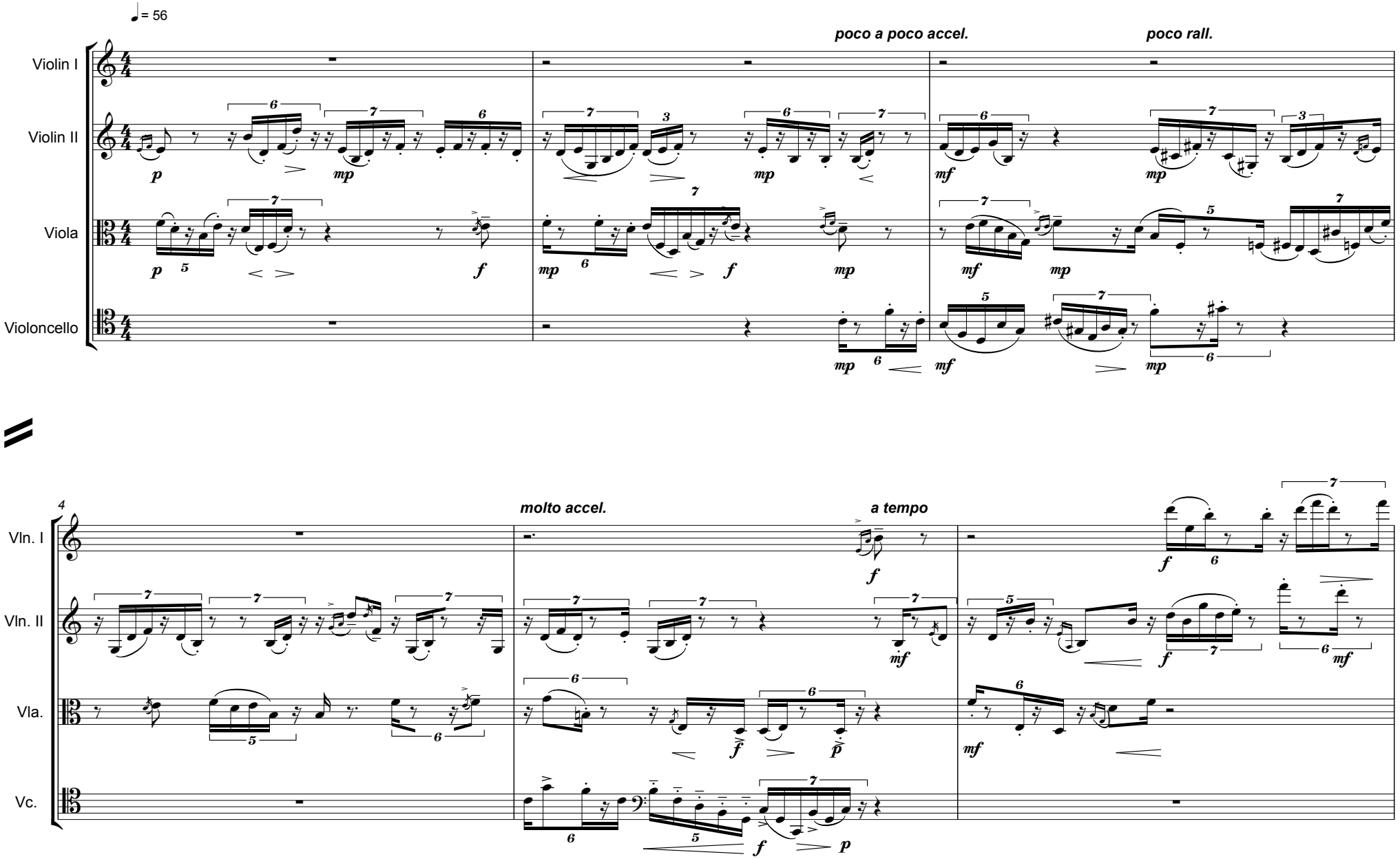
String Quartet

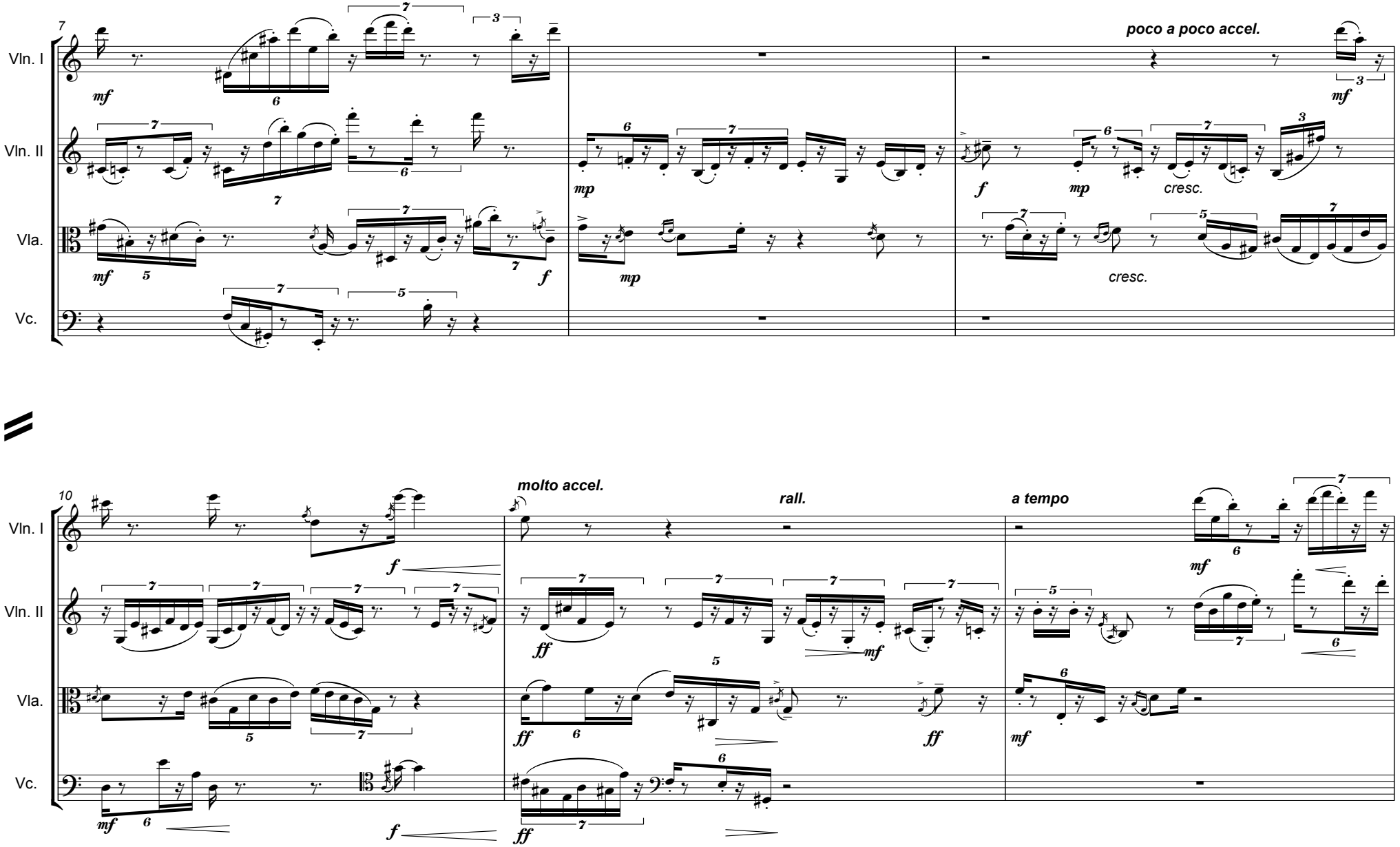
Claire Docherty

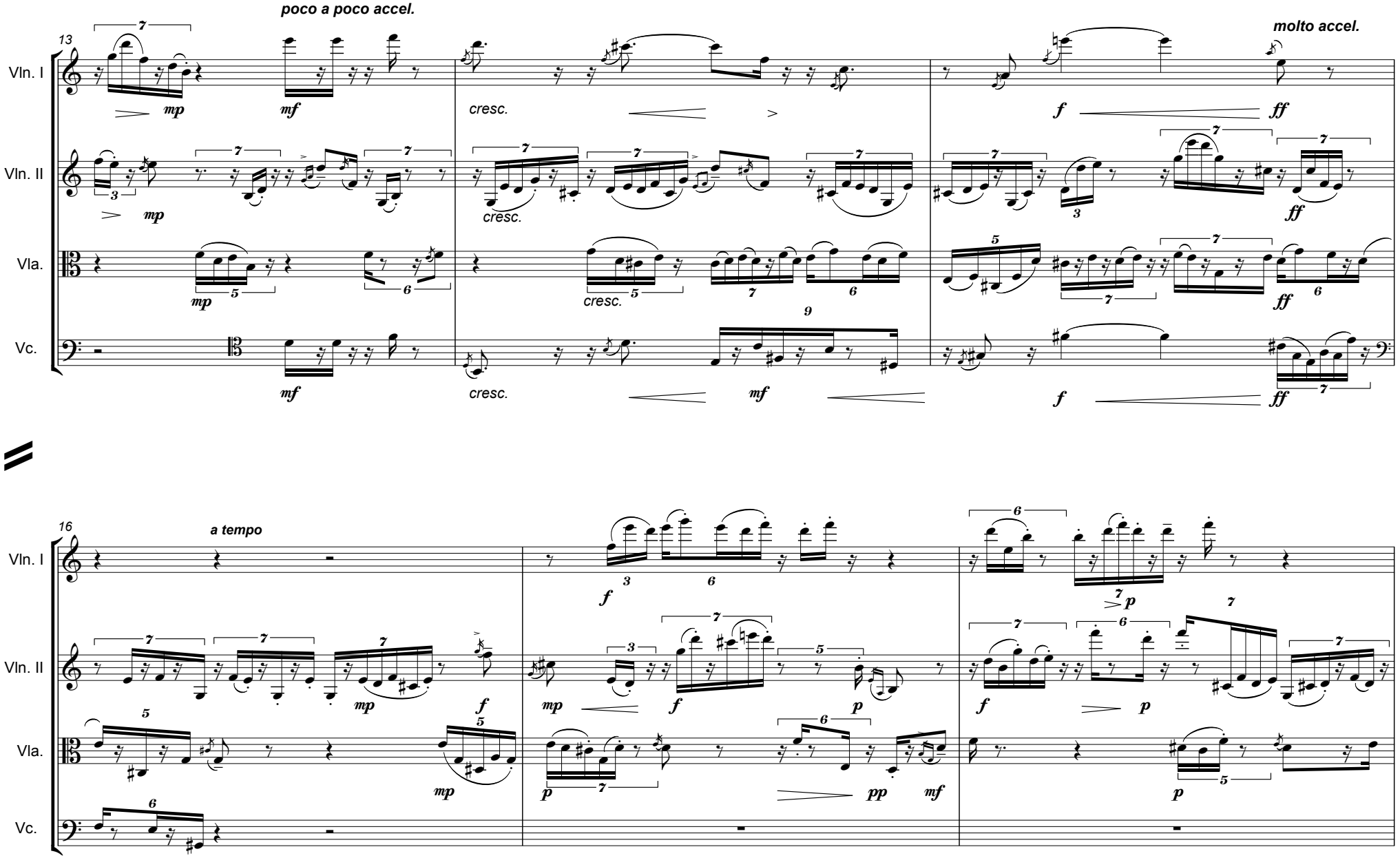
Movement I & II

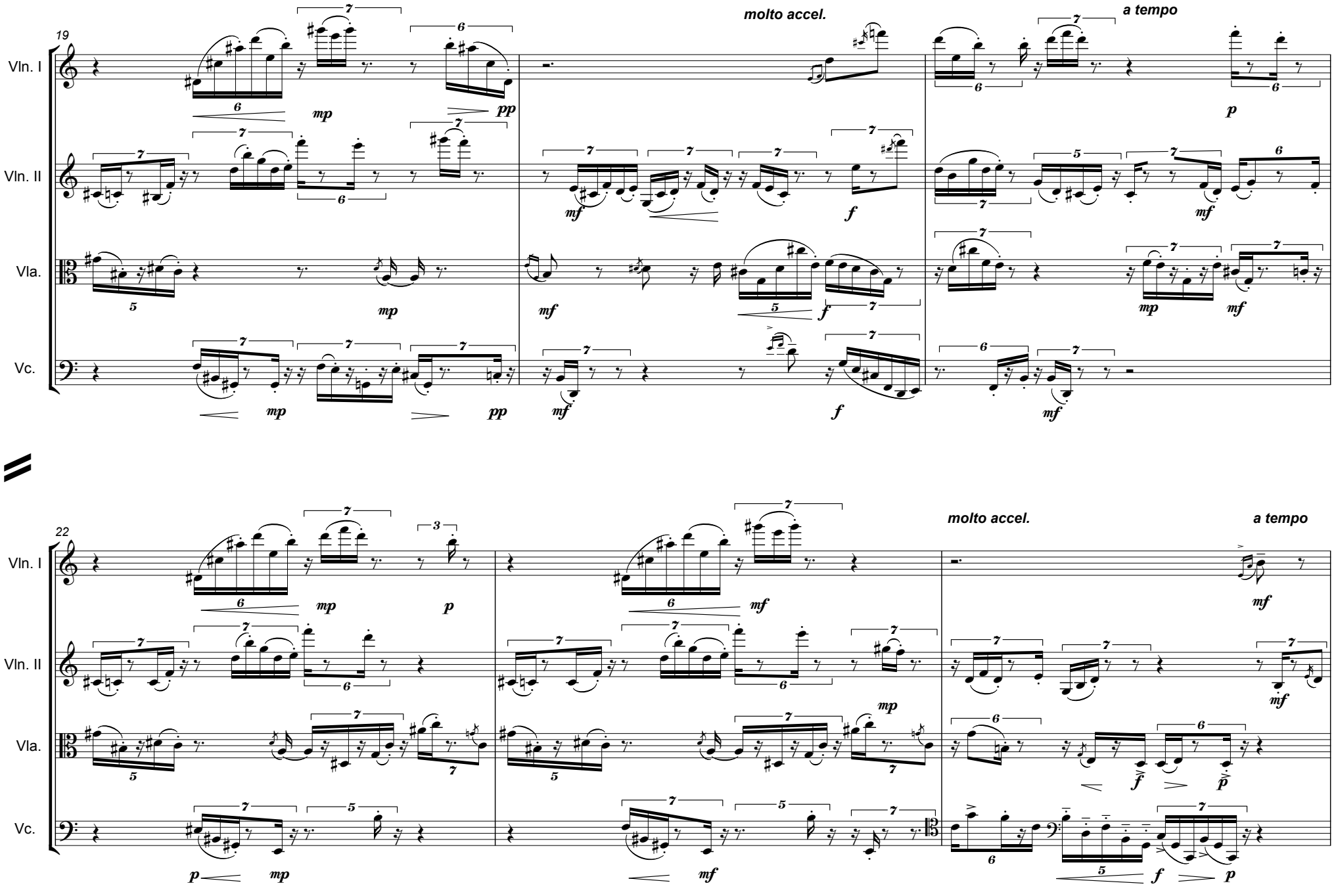
Glissandi with the bouncing bow, not fingers in col legno battuto ricochet (c.l.b.r.) =
During these passages the fingers are stopped on the specified pitches, while the bow is bounced with ricochet up and down the fingerboard in the direction and area specified by the diagram.

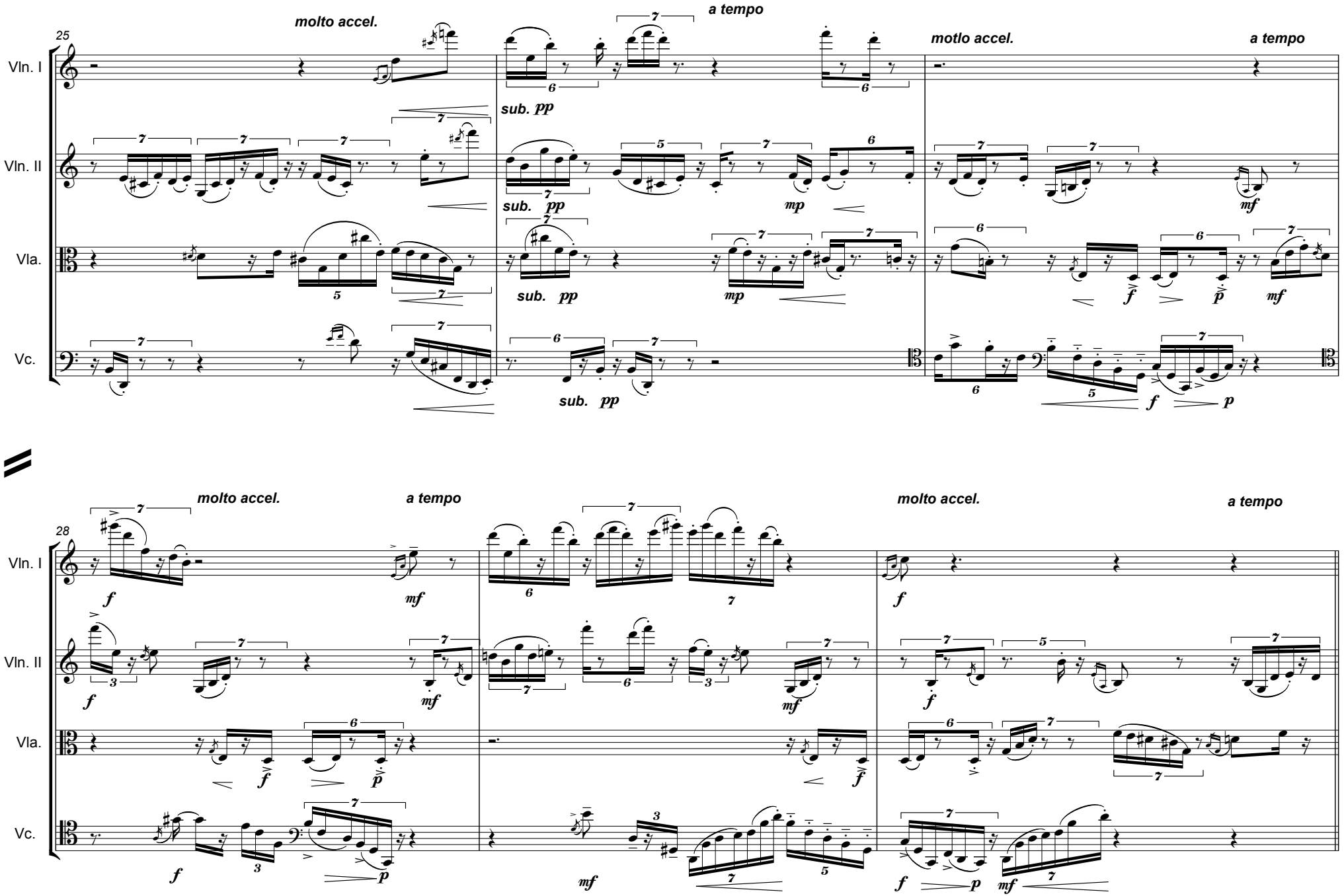
Movement I

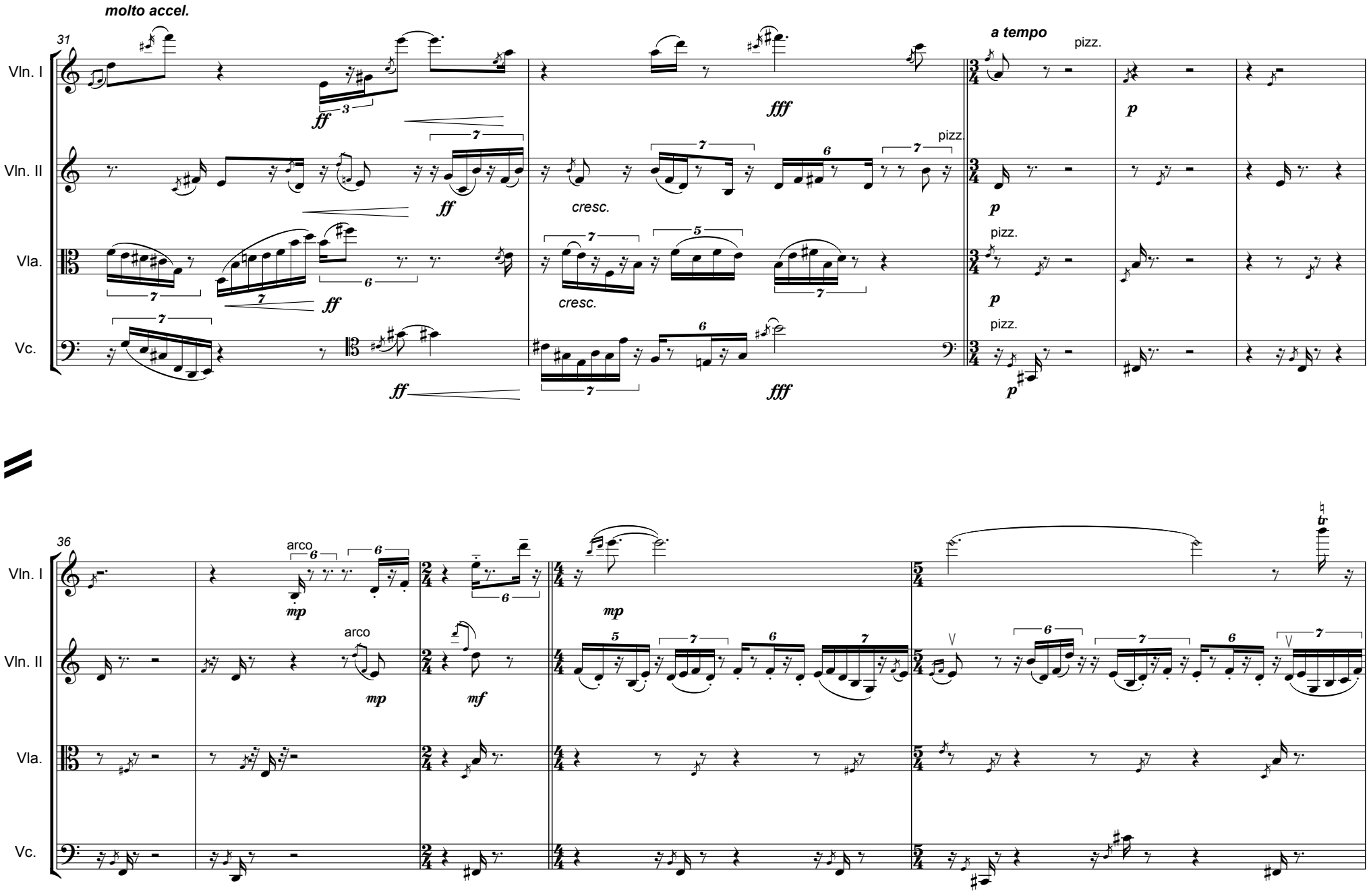

♩ = 56
poco a poco accel.
poco rall.
Violin I
Violin II
Viola
Violoncello
molto accel.
a tempo
Vln. I
Vln. II
Vla.
Vc.

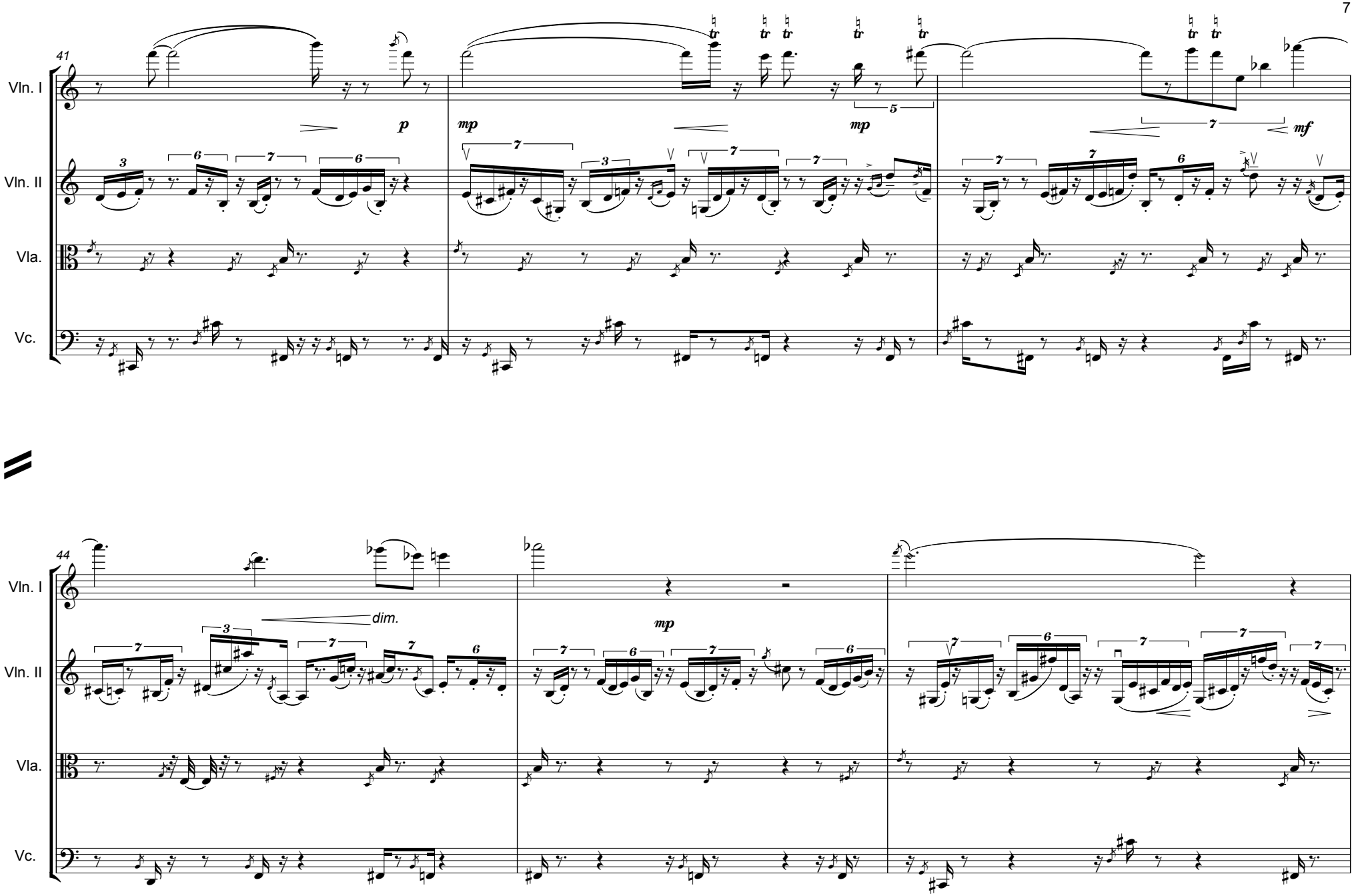

7
Vln. I
Vln. II
Vla.
Vc.
poco a poco accel.
cresc.
10
molto accel.
rall.
a tempo

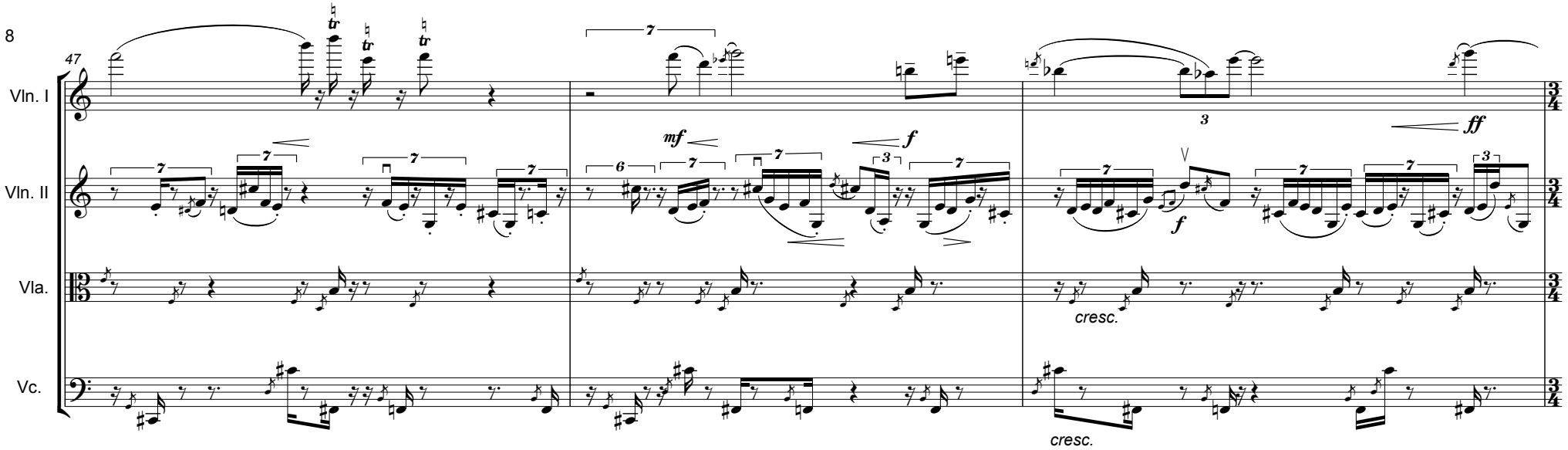

poco a poco accel.
molto accel.
13
Vln. I
Vln. II
Vla.
Vc.
mp
mf
cresc.
f
ff
a tempo
16
pp

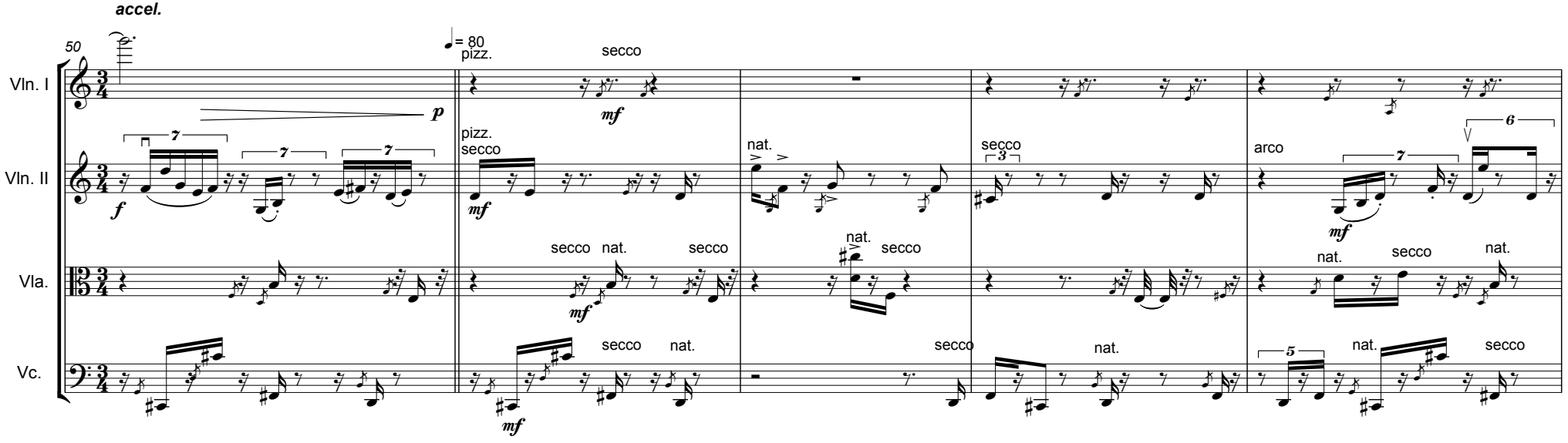

19
Vln. I
Vln. II
Vla.
Vc.
molto accel.
a tempo
22
molto accel.
a tempo

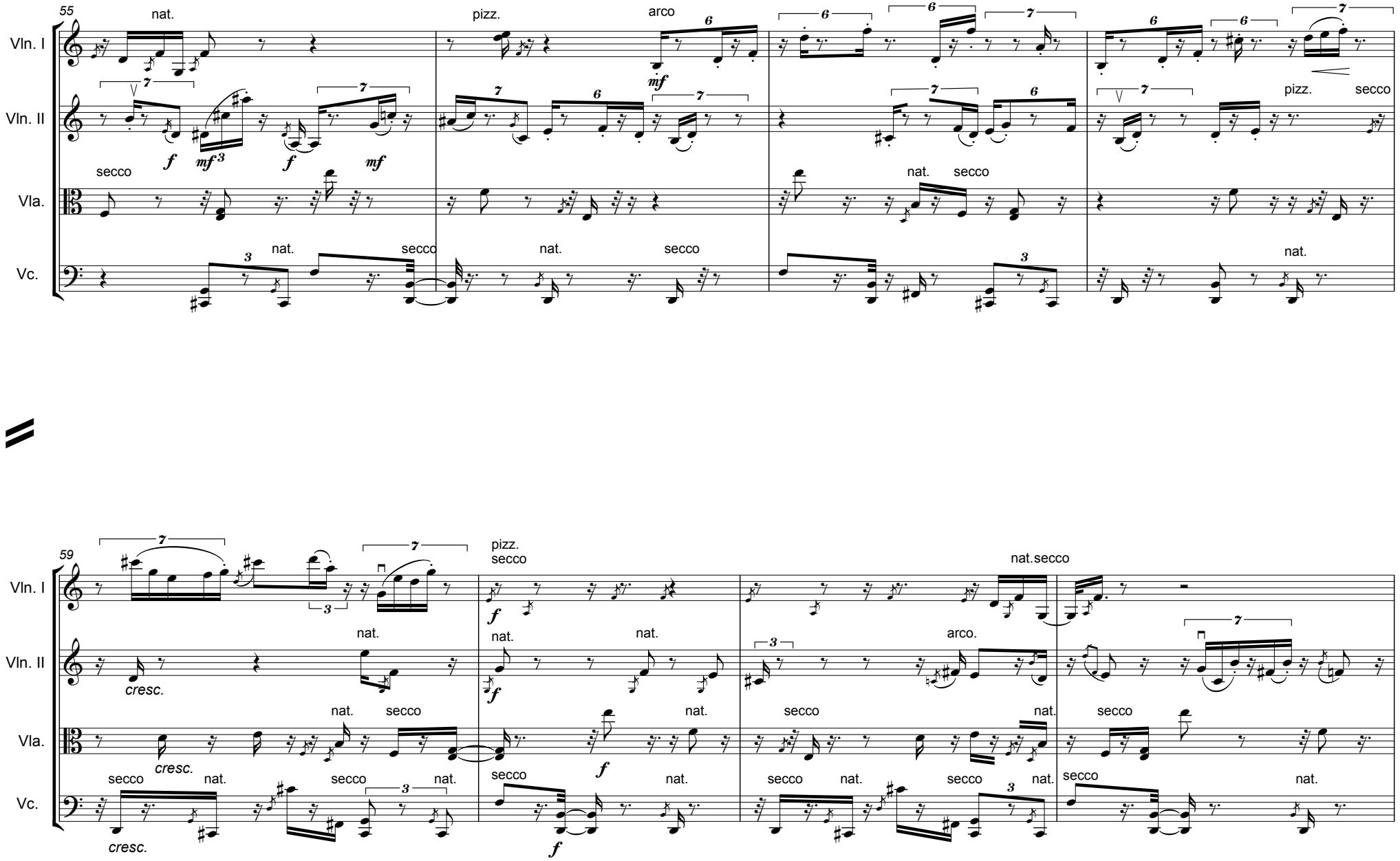

25
molto accel.
a tempo
motlo accel.
a tempo
Vln. I
Vln. II
Vla.
Vc.
sub. pp
mp
mf
f
p
28
molto accel.
a tempo
molto accel.
a tempo

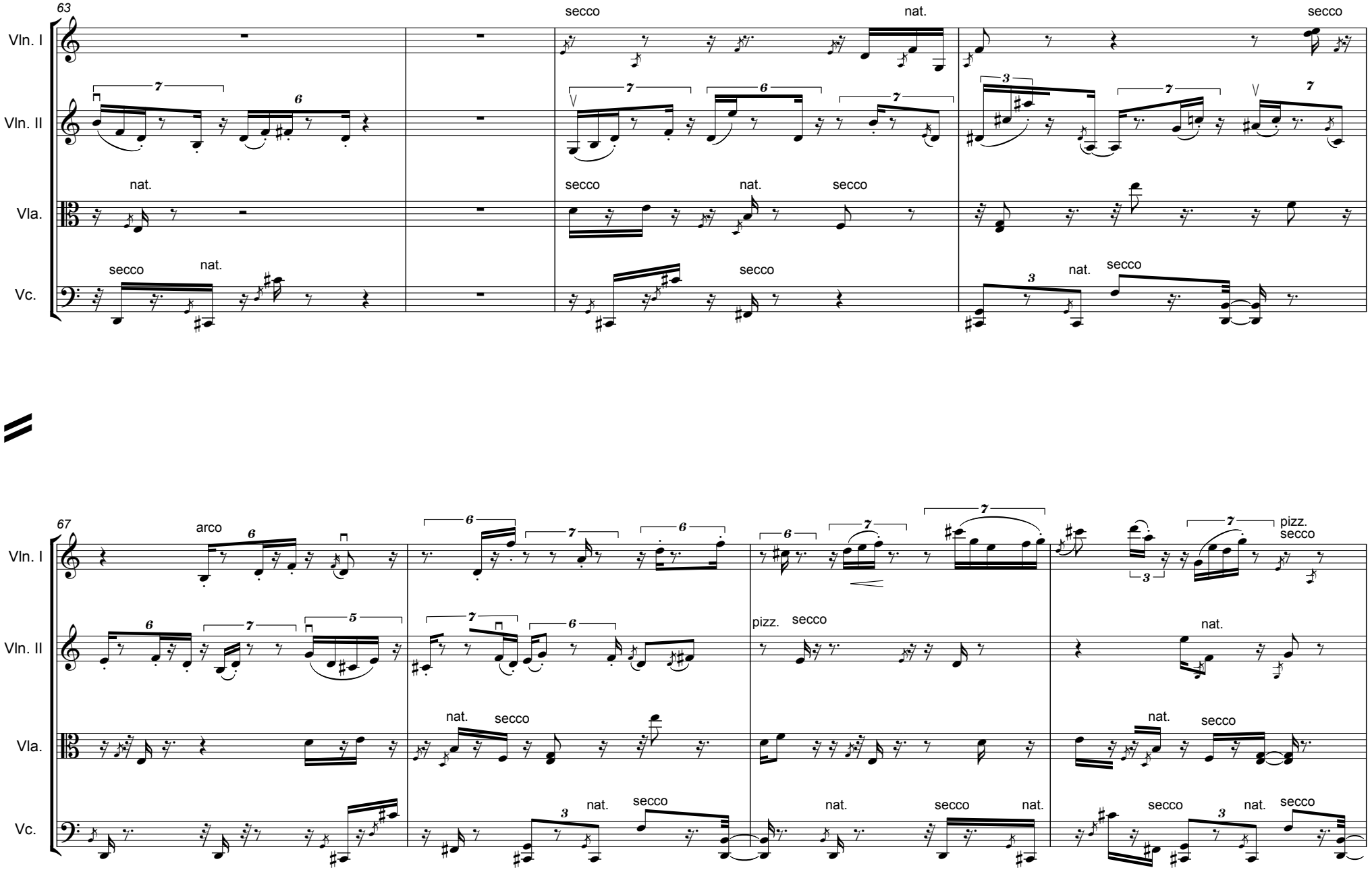

molto accel.
31
Vln. I
Vln. II
Vla.
Vc.
ff
fff
a tempo
pizz.
p
cresc.
36
arco
mp
mf

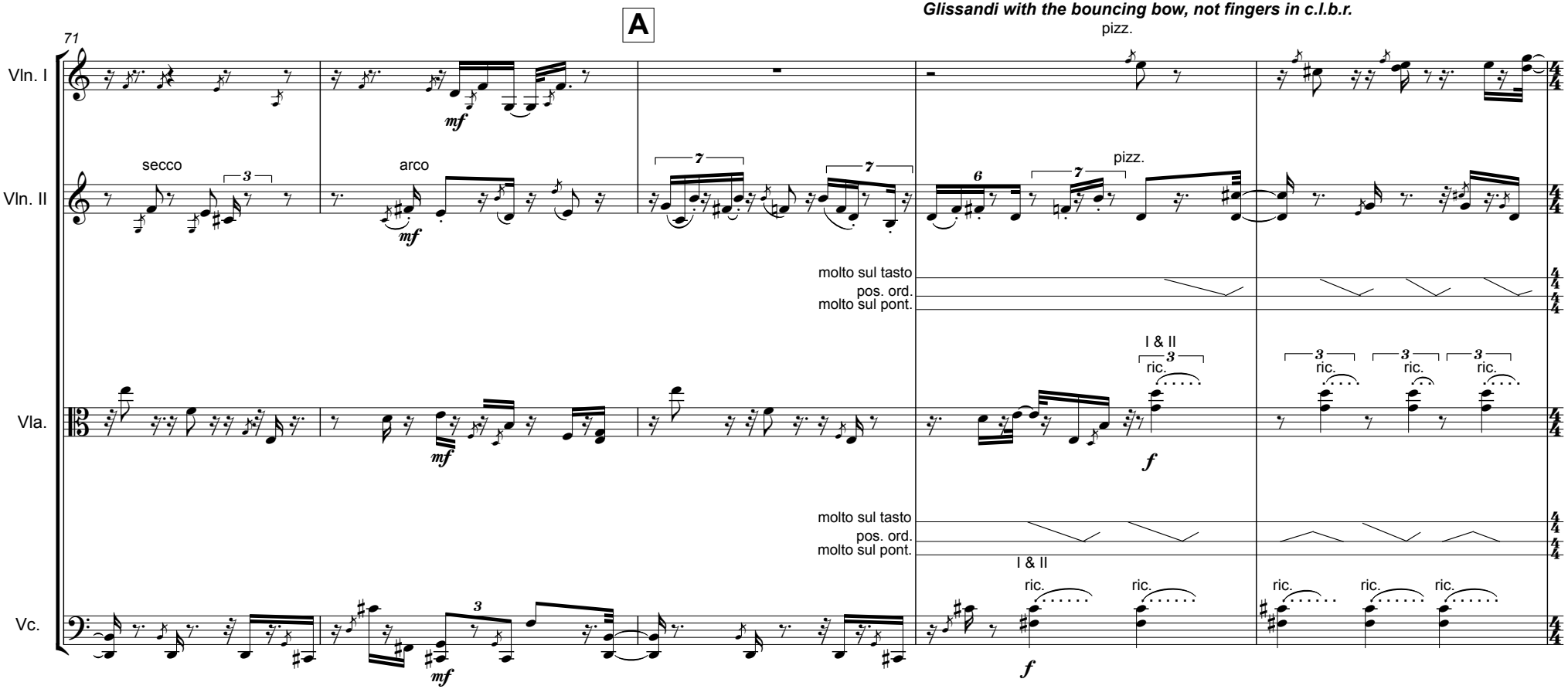

41
Vln. I
Vln. II
Vla.
Vc.
p
mp
mp
mf
44
dim.
mp

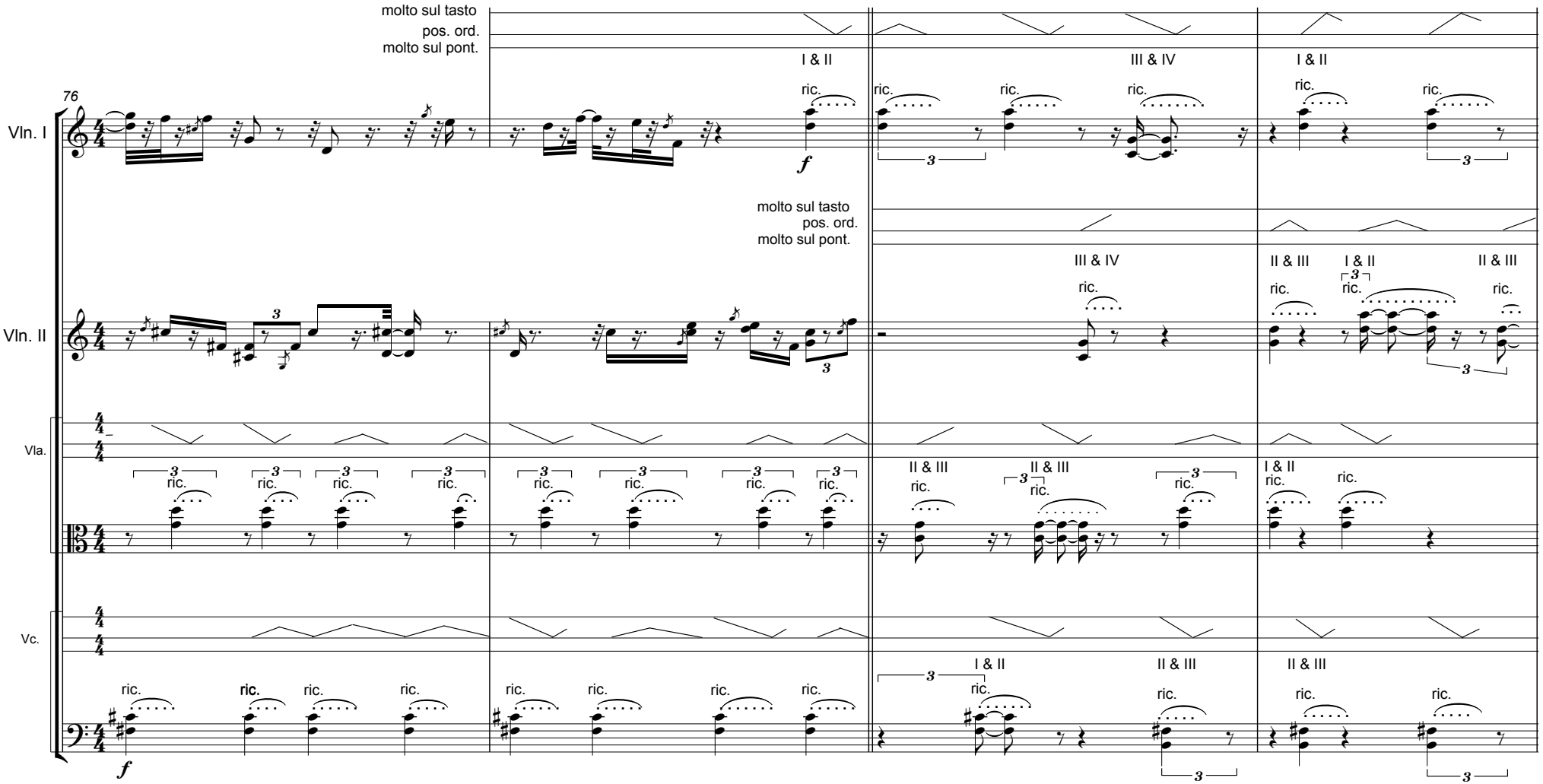

47
Vln. I
Vln. II
Vla.
Vc.
mf
f
ff
cresc.
cresc.

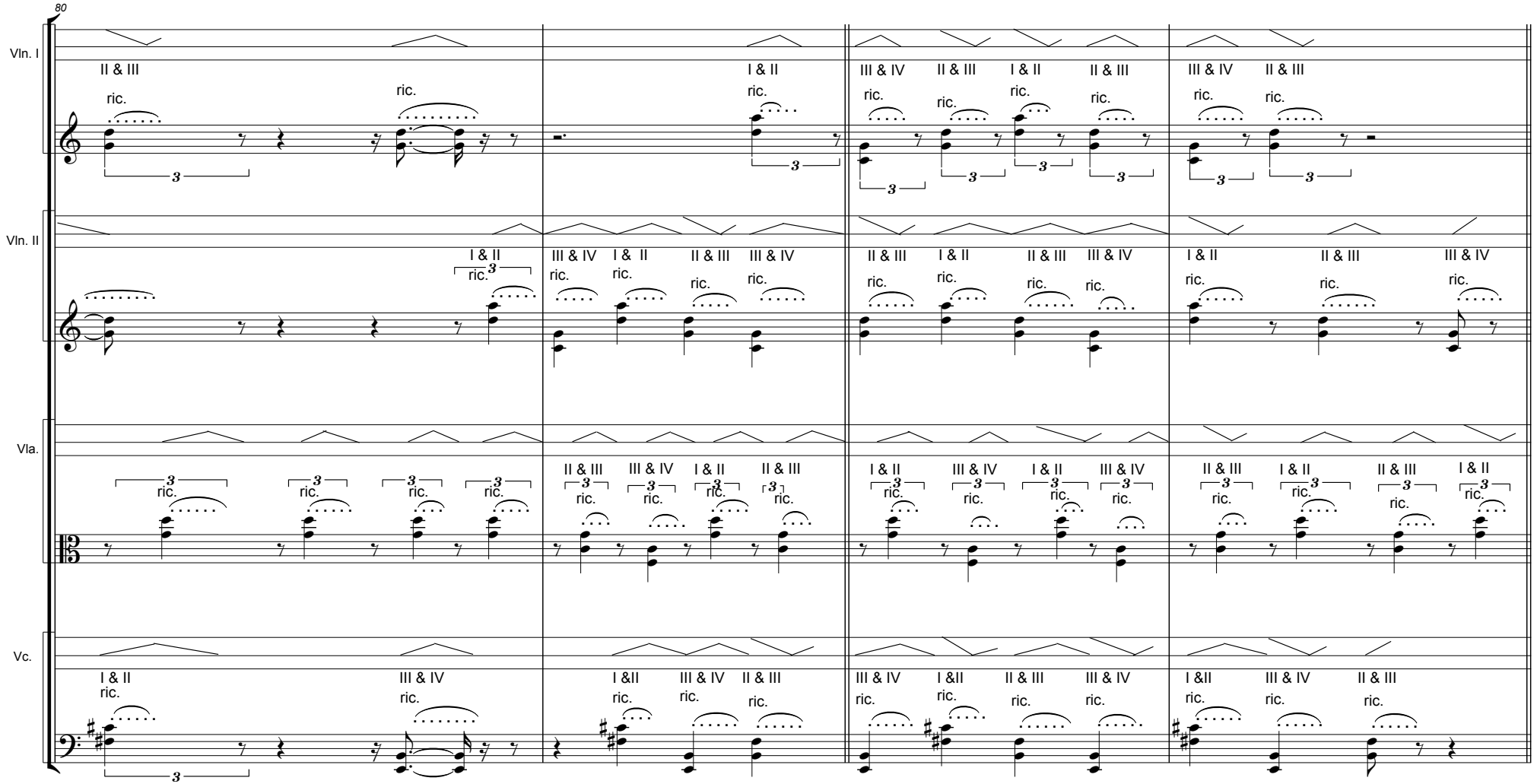

accel.
50
♩= 80
pizz.
secco
Vln. I
Vln. II
Vla.
Vc.
p
f
mf
pizz.
secco
nat.
secco
arco
secco nat. secco
nat. secco
nat. secco nat.
secco nat.
secco
nat.
nat. secco

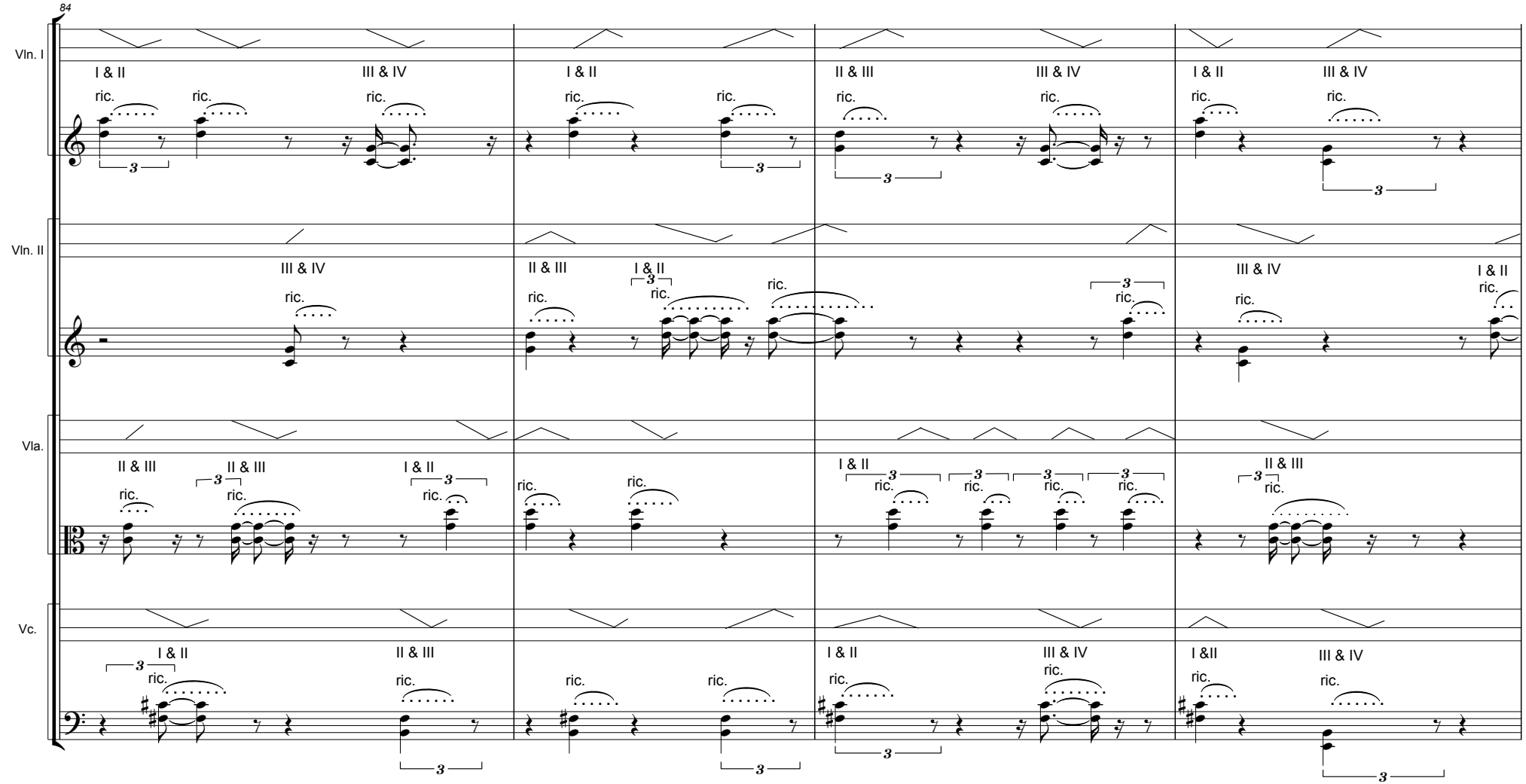

55
Vln. I
Vln. II
Vla.
Vc.
nat.
pizz.
arco
secco
nat.
secco
pizz.
secco
59
pizz.
secco
nat.secco
arco.
cresc.

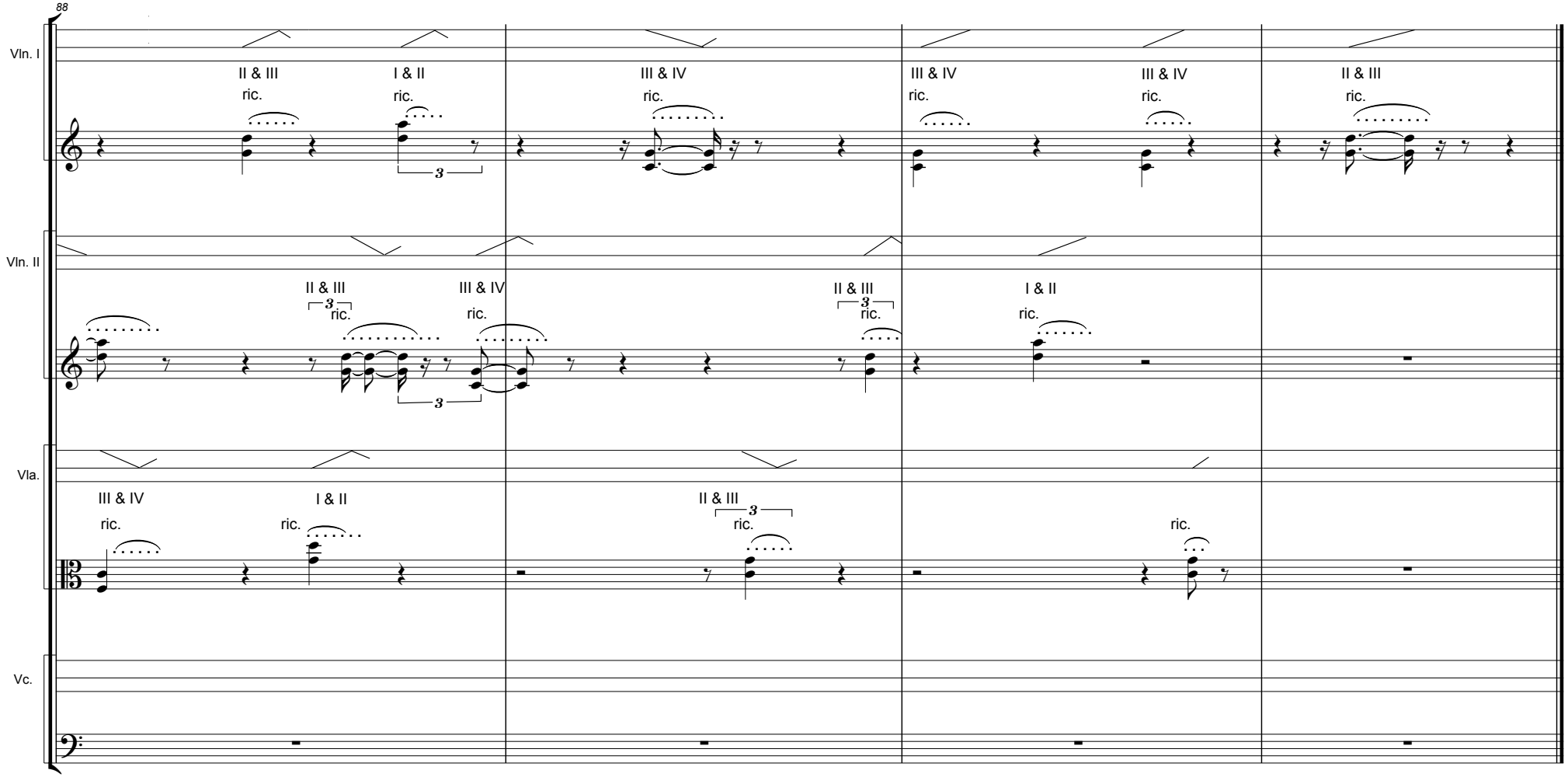

63
Vln. I
Vln. II
Vla.
Vc.
secco
nat.
secco
nat.
secco
nat.
secco
secco
nat.
secco
secco
nat.
secco
67
arco
pizz.
secco
pizz.
secco
nat.
nat.
secco
nat.
secco
nat.
secco
nat.
secco
nat.
secco


A
Glissandi with the bouncing bow, not fingers in c.l.b.r.
71
Vln. I
Vln. II
Vla.
Vc.
secco
arco
pizz.
molto sul tasto
pos. ord.
molto sul pont.
I & II
ric.
mf
f

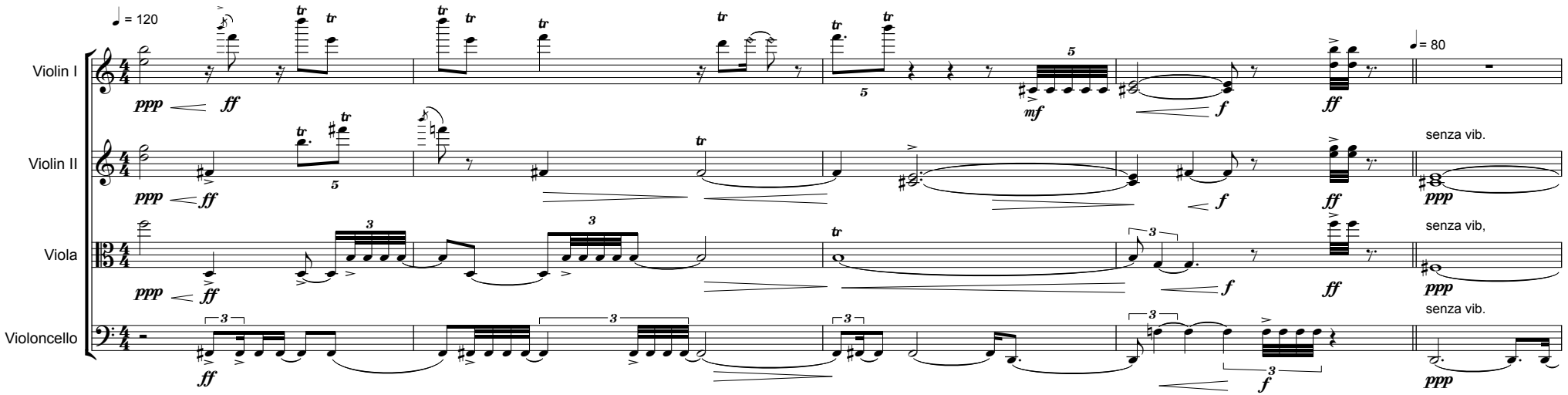

76
Vln. I
Vln. II
Vla.
Vc.
molto sul tasto
pos. ord.
molto sul pont.
I & II
III & IV
II & III
ric.
f

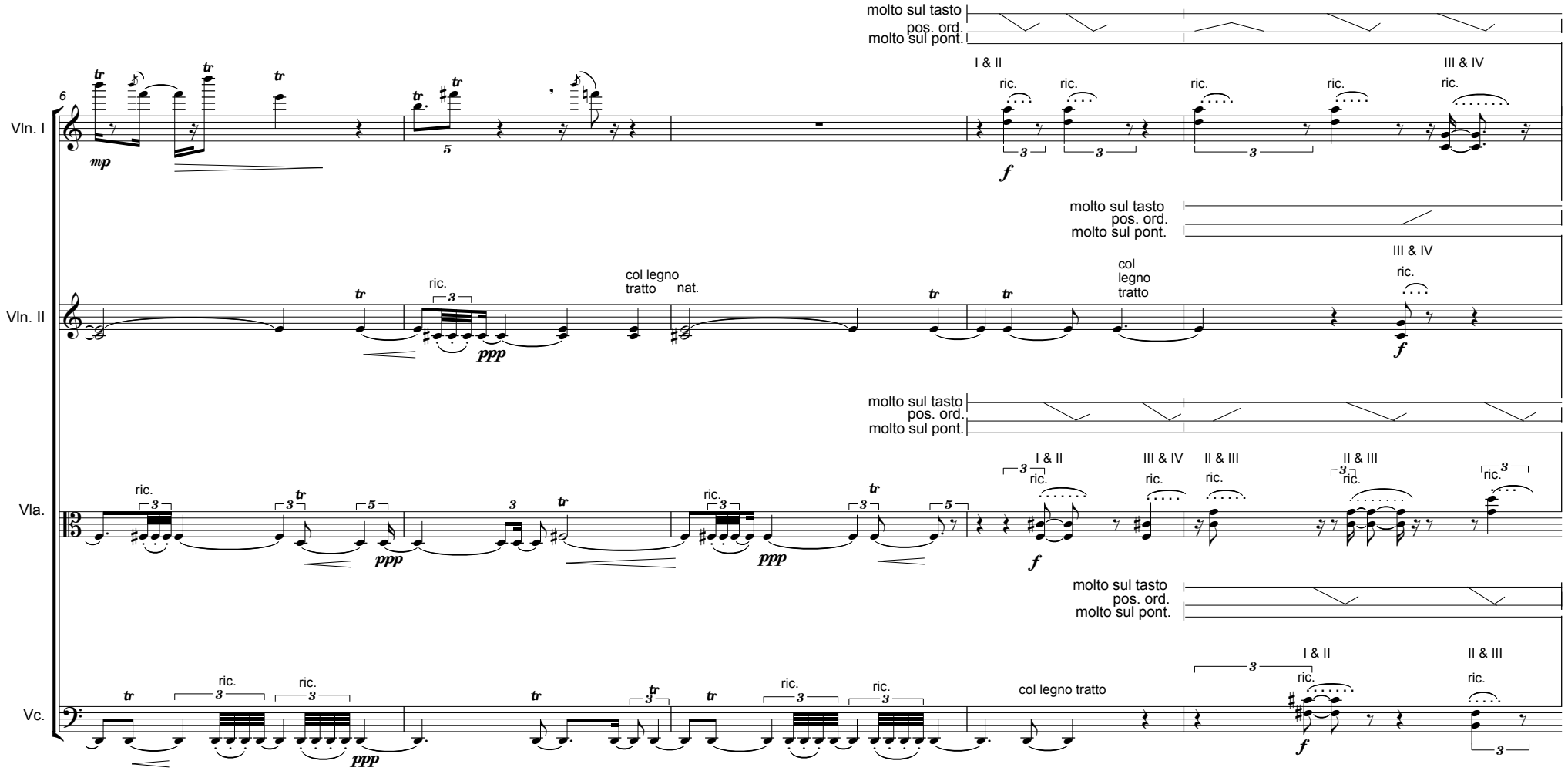

80
Vln. I
Vln. II
Vla.
Vc.
ric.
3

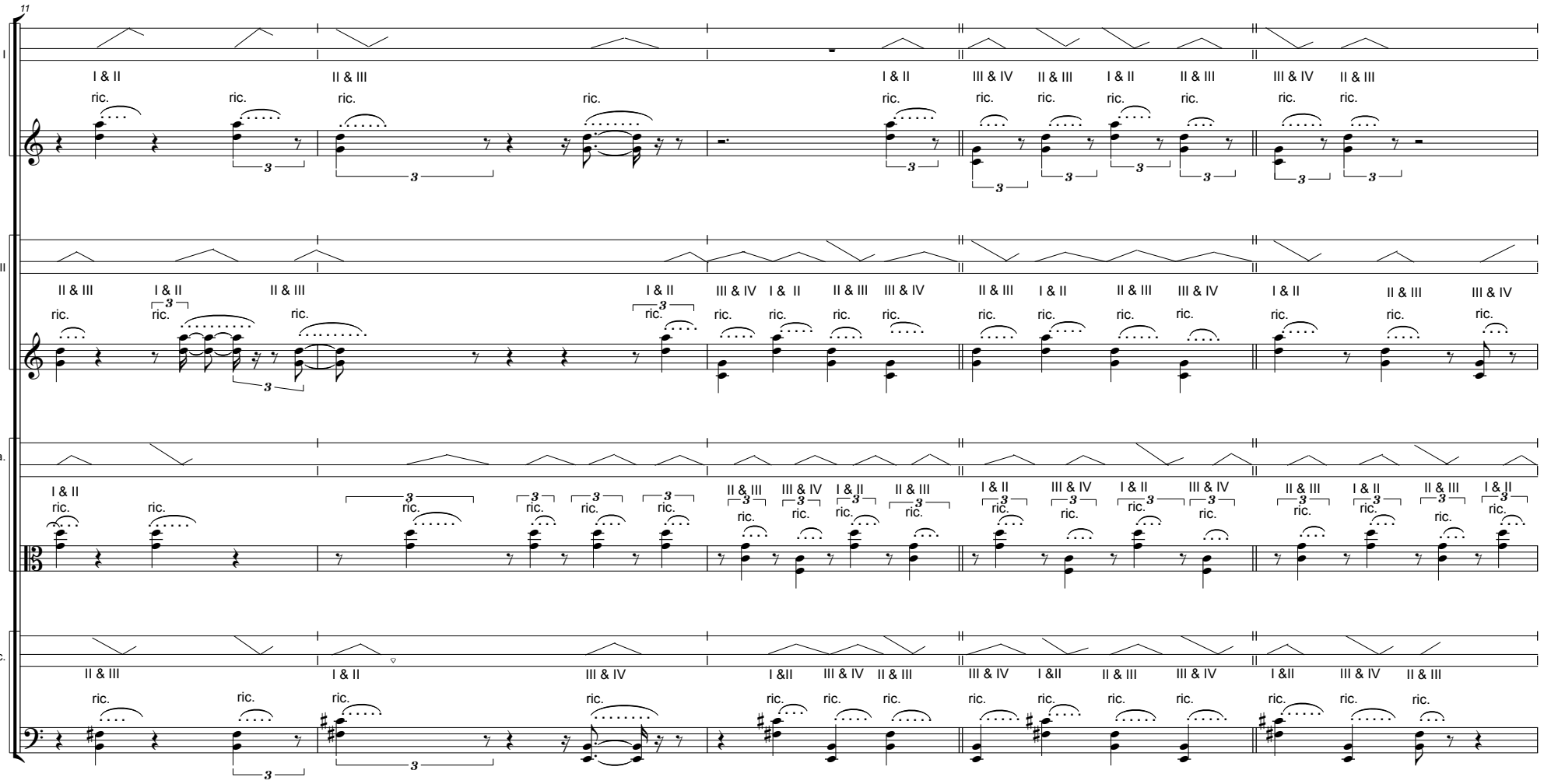

84
Vln. I
Vln. II
Vla.
Vc.
I & II
III & IV
II & III
ric.
3

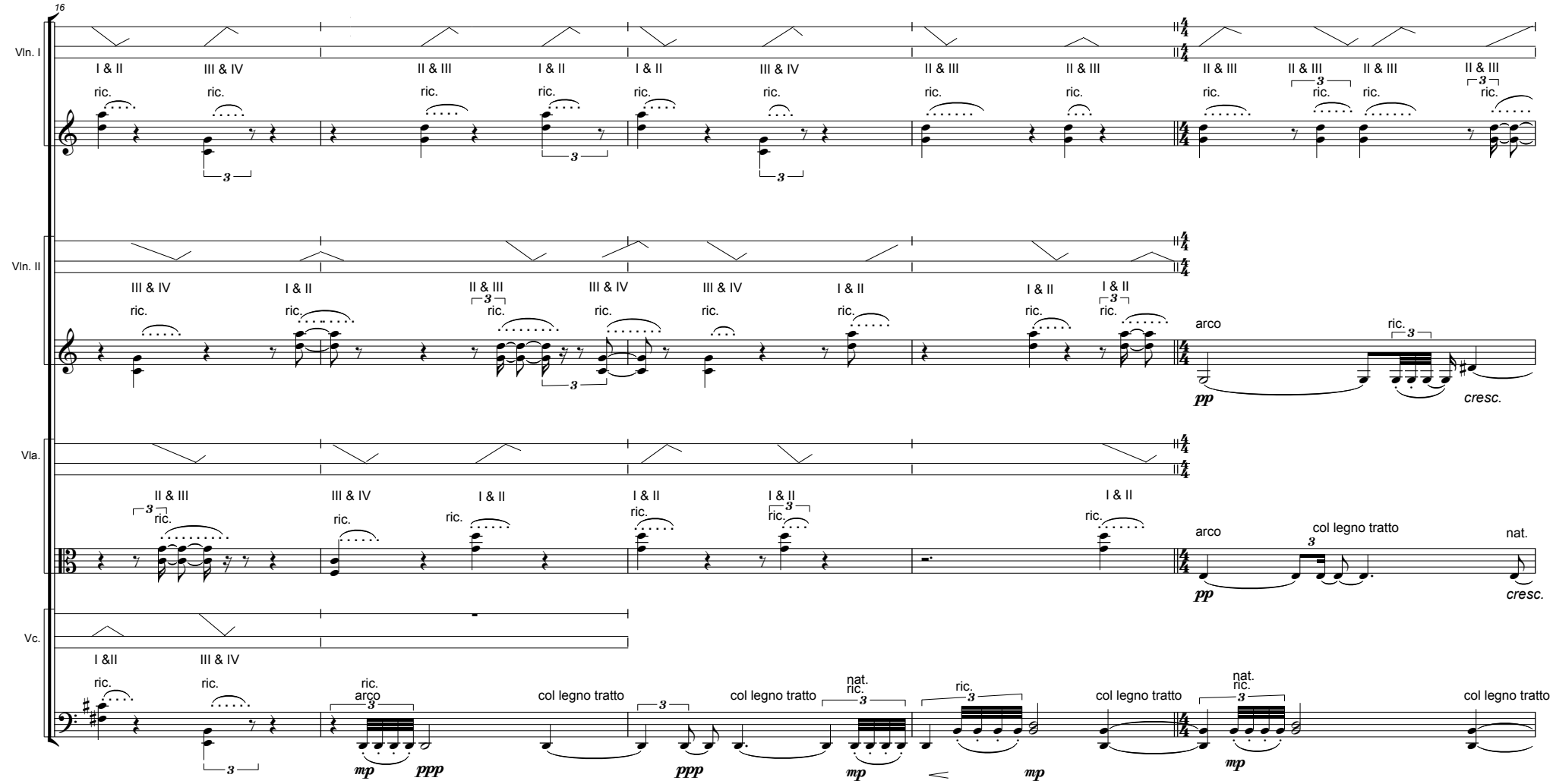

88
Vln. I
II & III
ric.
I & II
ric.
III & IV
ric.
III & IV
ric.
III & IV
ric.
II & III
ric.
Vln. II
II & III
ric.
III & IV
ric.
II & III
ric.
I & II
ric.
Vla.
III & IV
ric.
I & II
ric.
II & III
ric.
ric.
Vc.

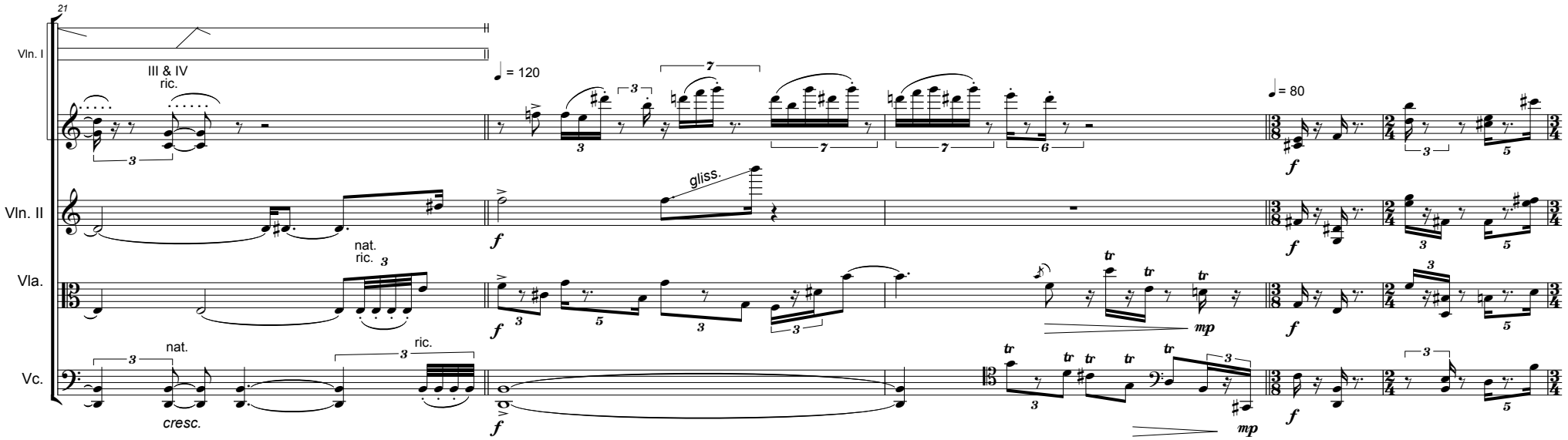
Movement II

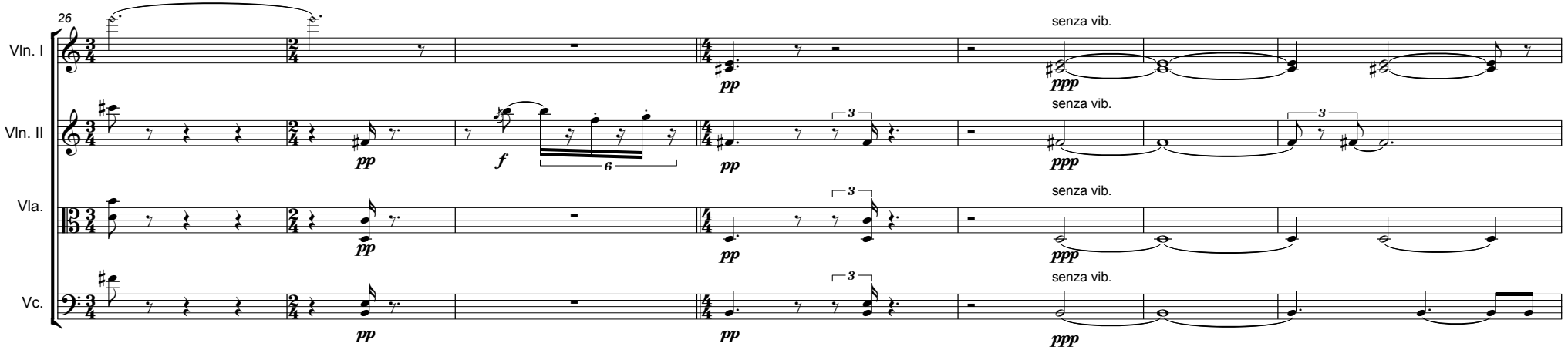

♩ = 120
Violin I
Violin II
Viola
Violoncello
ppp
ff
mf
f
♩ = 80
senza vib.
senza vib,
senza vib.

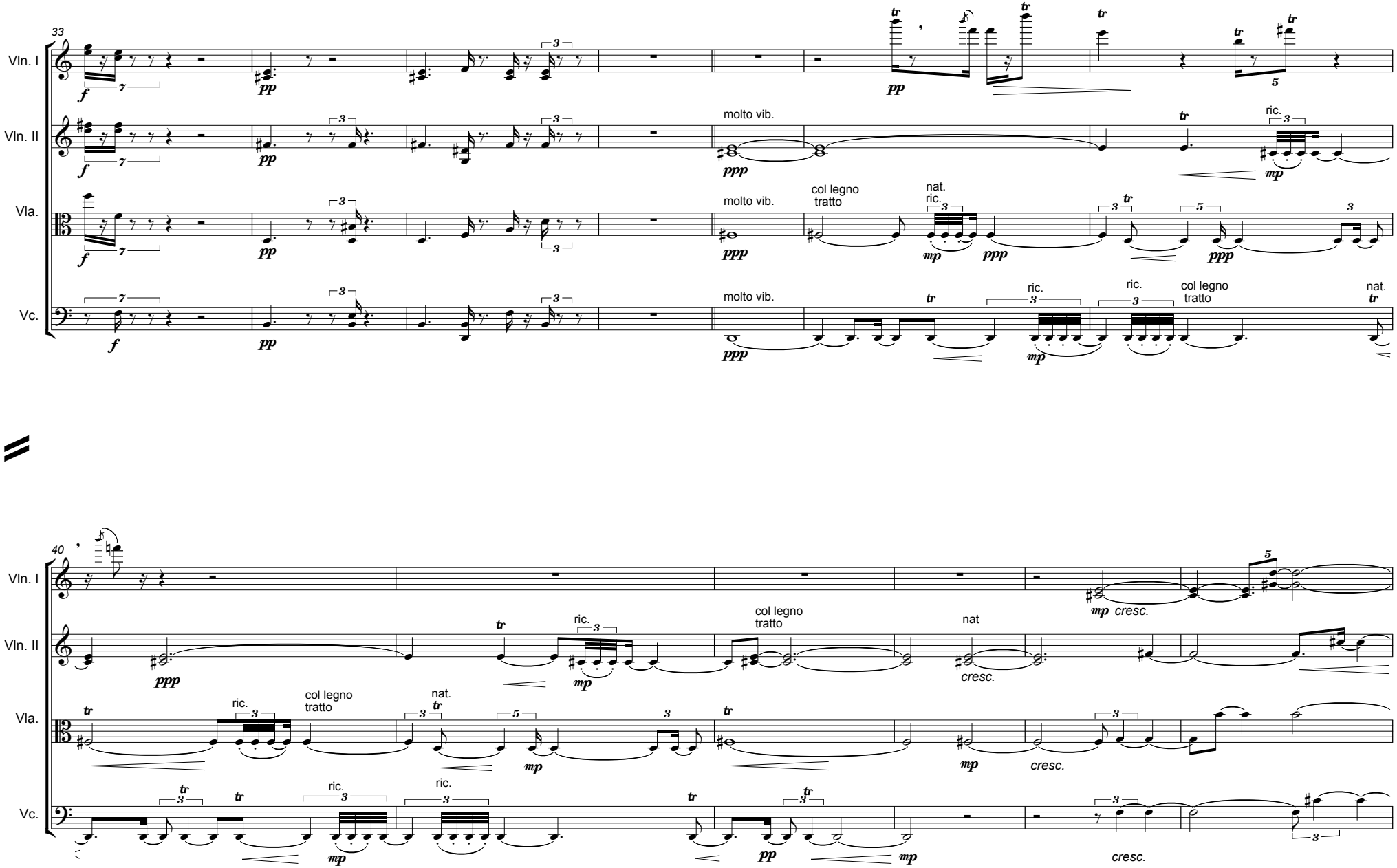

6
Vln. I
Vln. II
Vla.
Vc.
mp
ppp
f
molto sul tasto
pos. ord.
molto sul pont.
I & II
III & IV
II & III
ric.
col legno tratto
nat.
col legno tratto

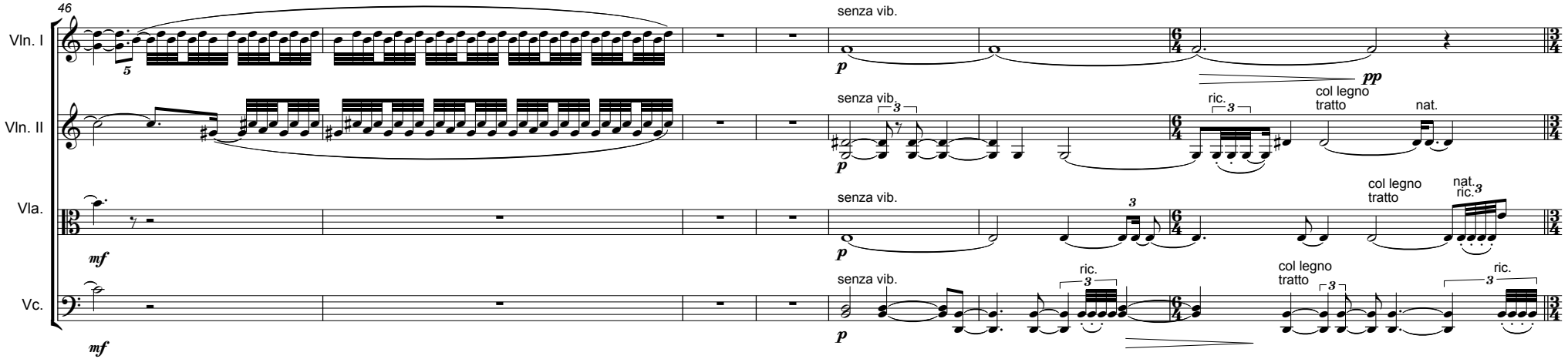

11
Vln. I
Vln. II
Vla.
Vc.
ric.

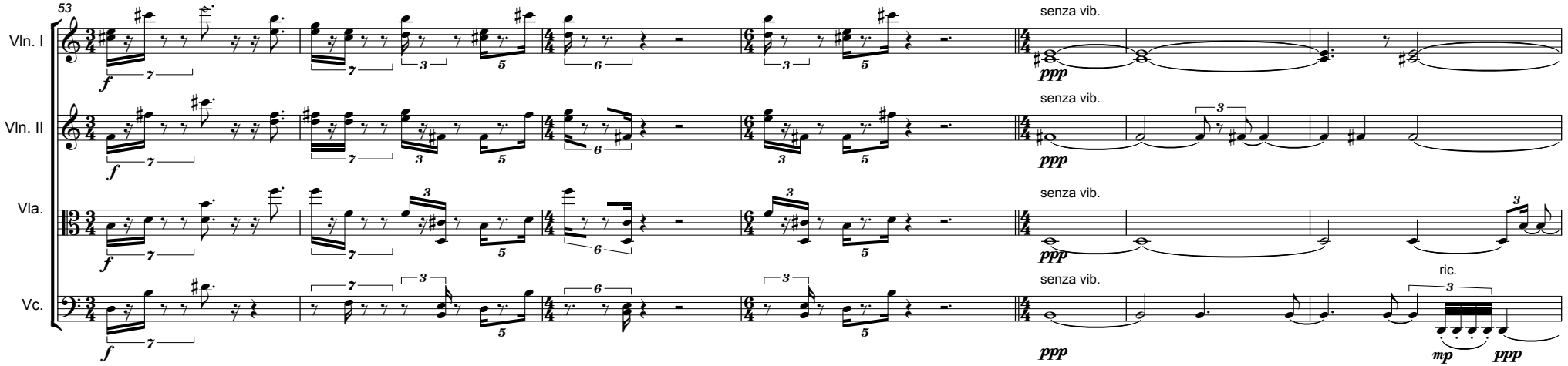

16
Vln. I
Vln. II
Vla.
Vc.
I & II
III & IV
II & III
ric.
arco
pp
cresc.
col legno tratto
nat.
mp
ppp

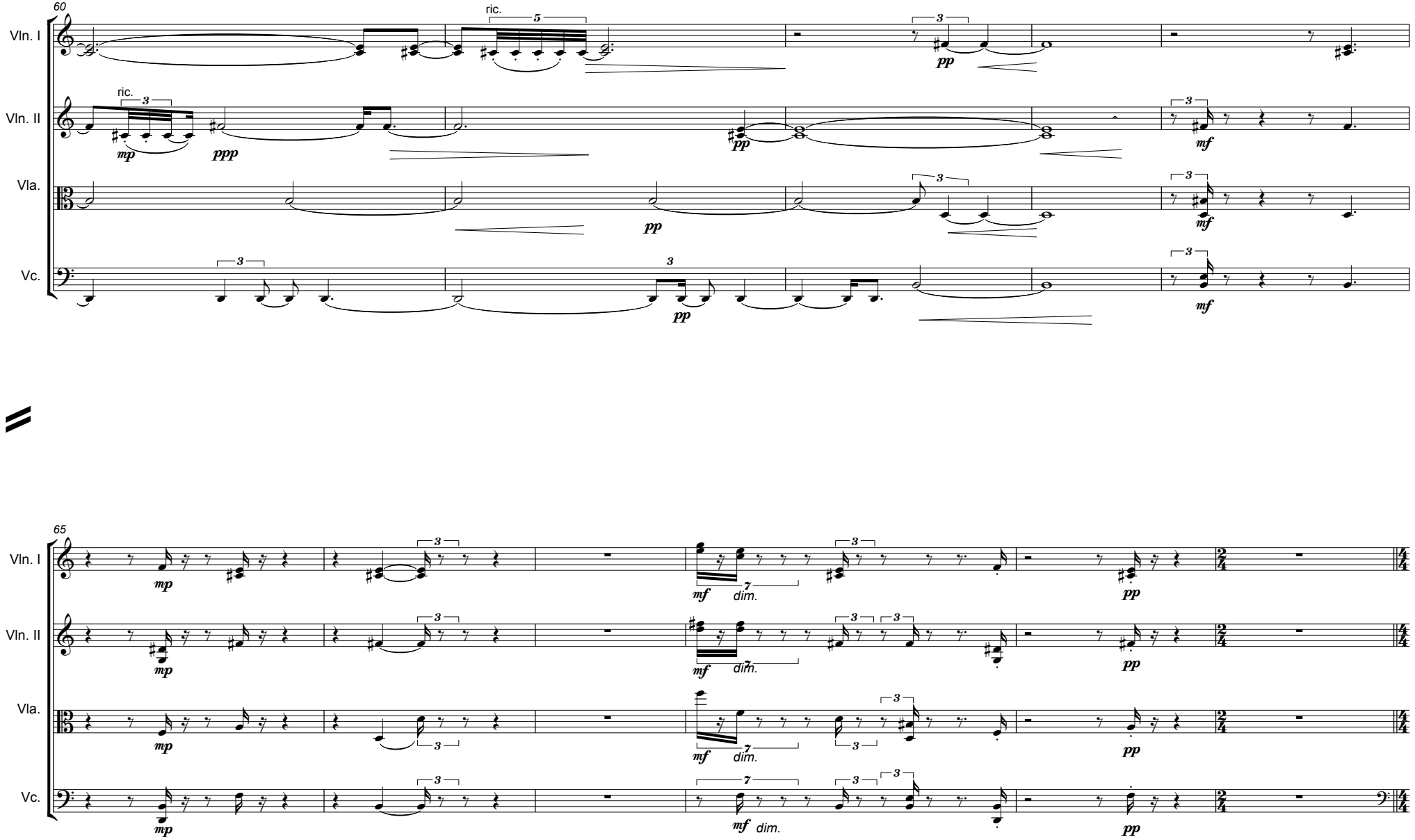

21
Vln. I
III & IV
ric.
♩ = 120
♩ = 80
Vln. II
gliss.
Vla.
nat.
ric.
Vc.
nat.
ric.
cresc.

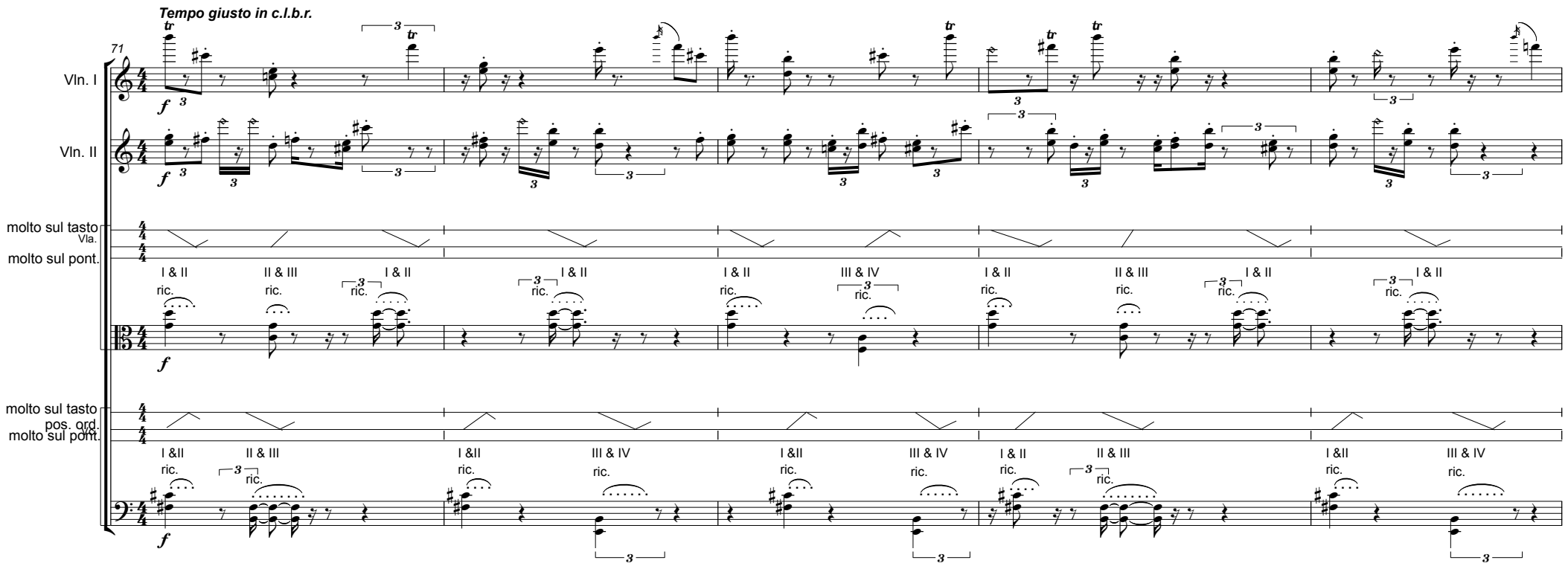

26
Vln. I
senza vib.
Vln. II
senza vib.
Vla.
senza vib.
Vc.
senza vib.

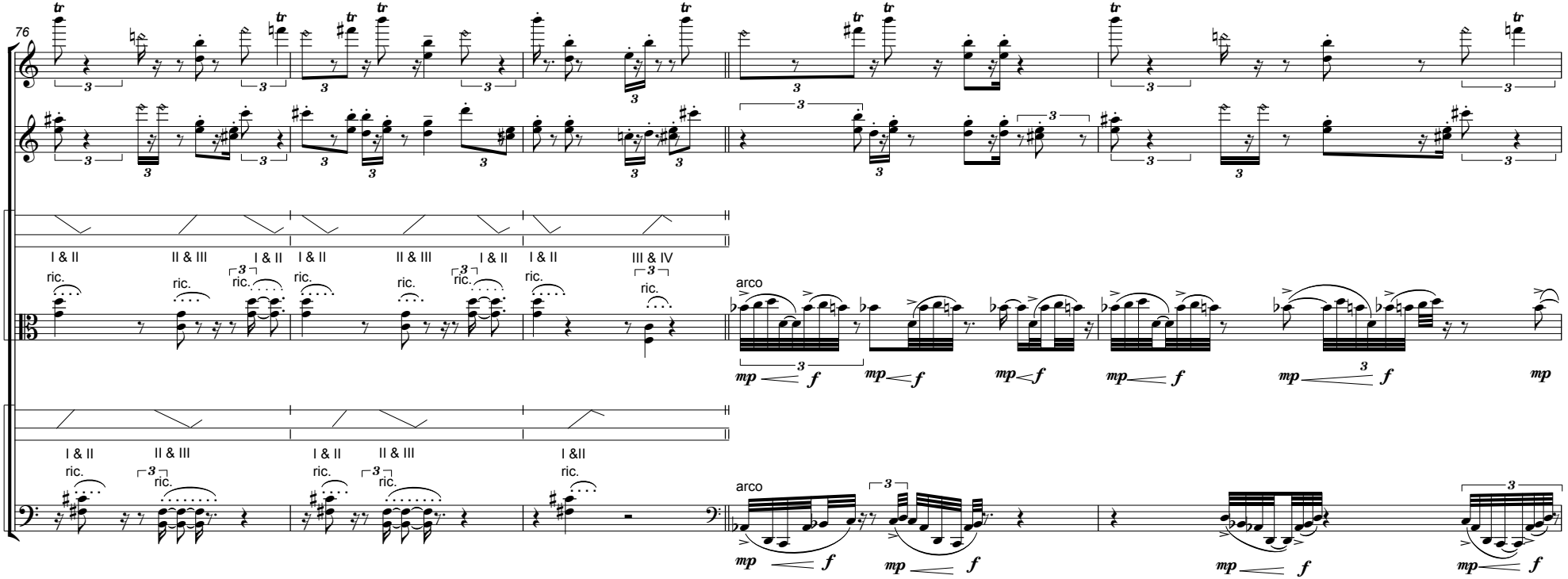

33
Vln. I
Vln. II
Vla.
Vc.
molto vib.
col legno tratto
nat.
ric.
40
cresc.

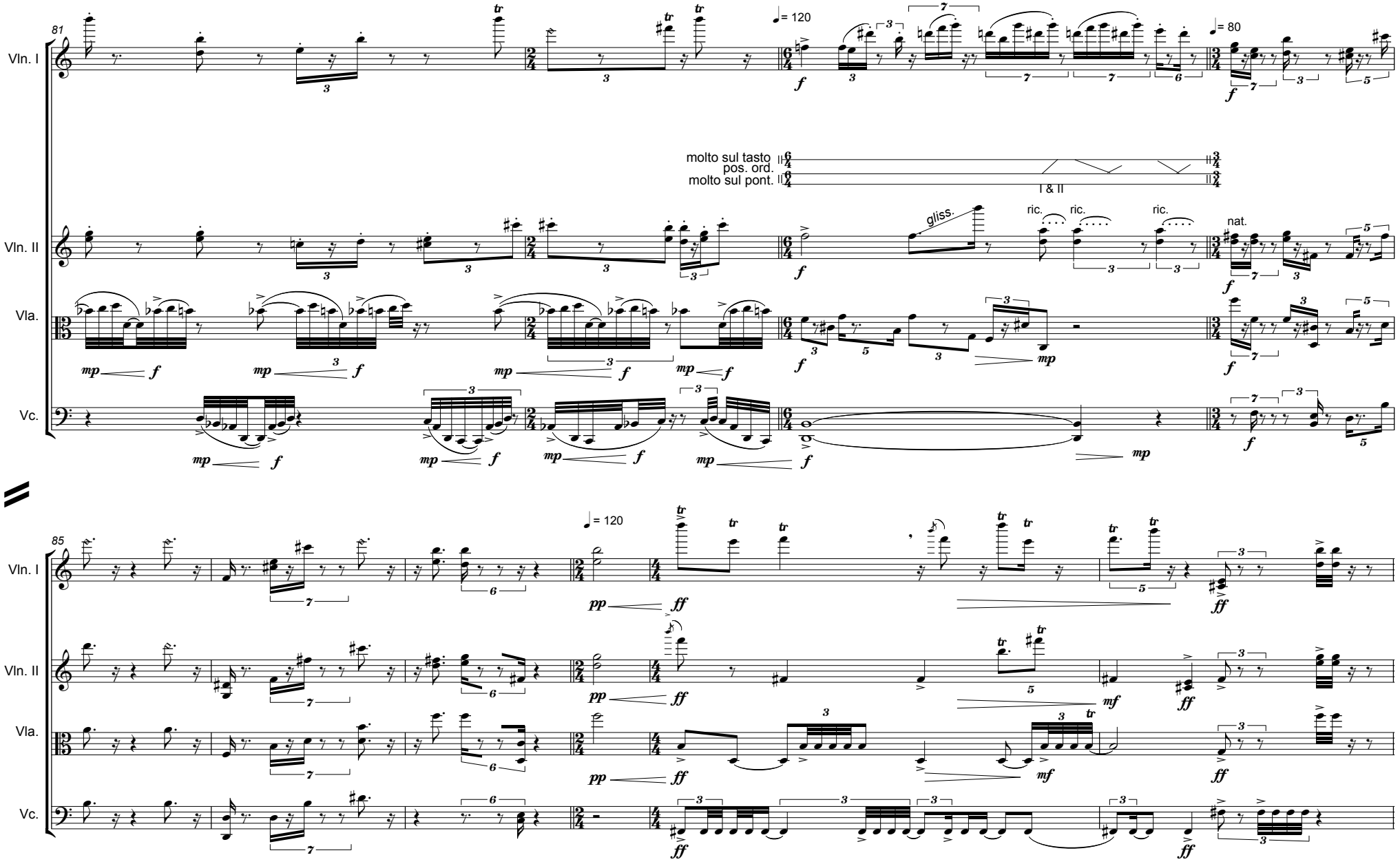

46
Vln. I
Vln. II
Vla.
Vc.
senza vib.
col legno tratto
nat.
ric.

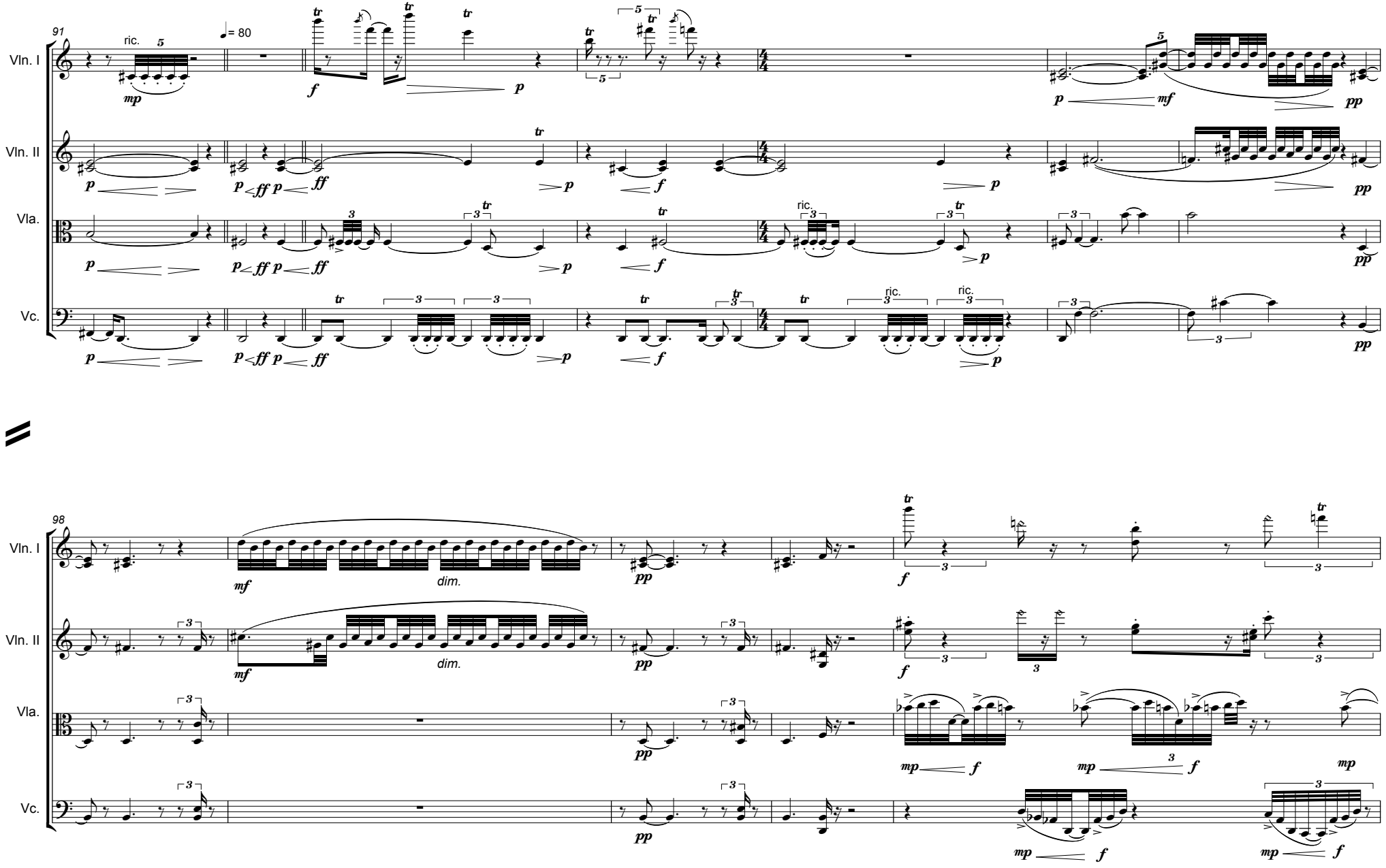

53
Vln. I
Vln. II
Vla.
Vc.
senza vib.
ric.

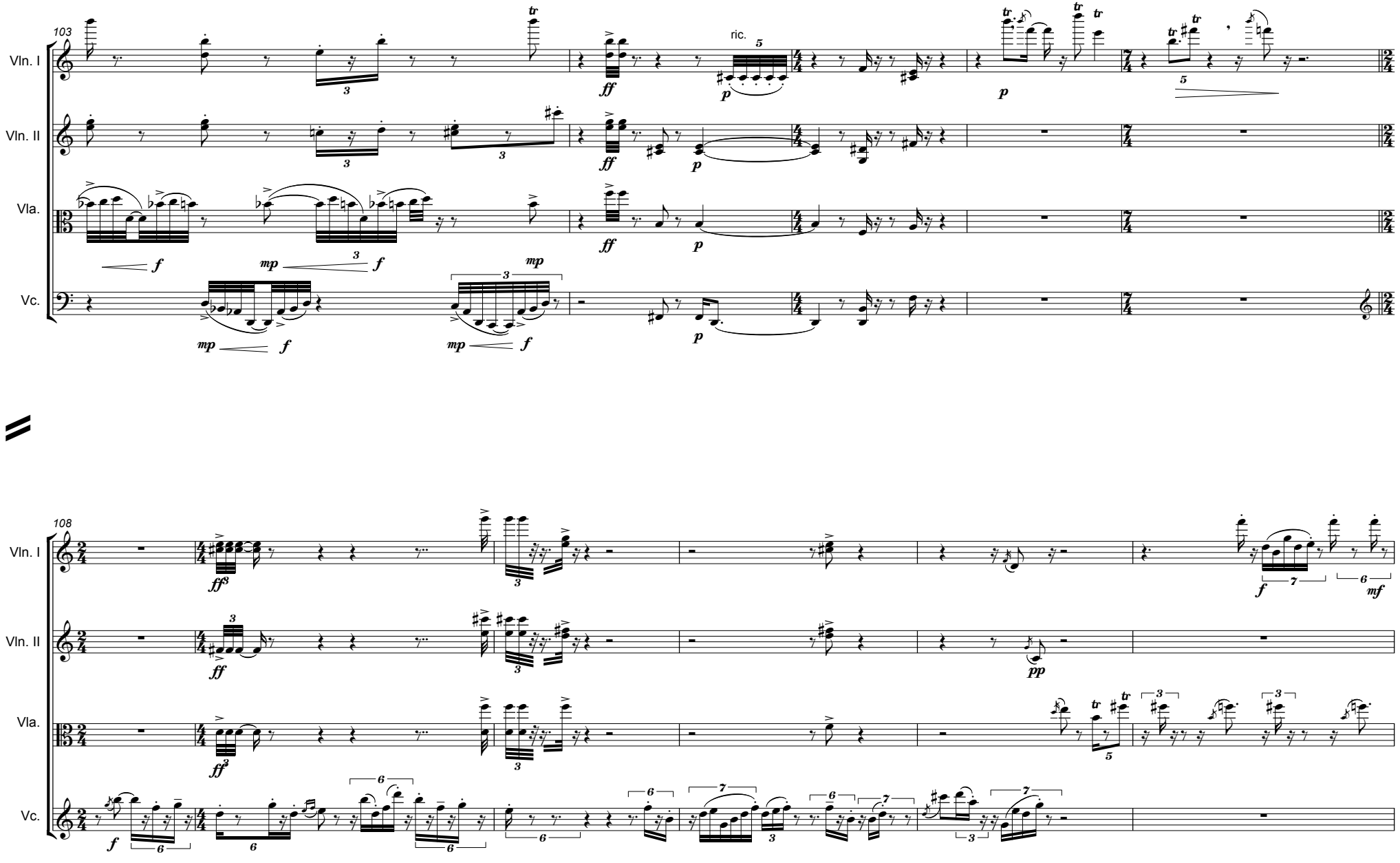

60
Vln. I
Vln. II
Vla.
Vc.
ric.
ric.
mp
ppp
pp
pp
pp
pp
mf
mf
mf
65
Vln. I
Vln. II
Vla.
Vc.
mp
mf
dim.
pp

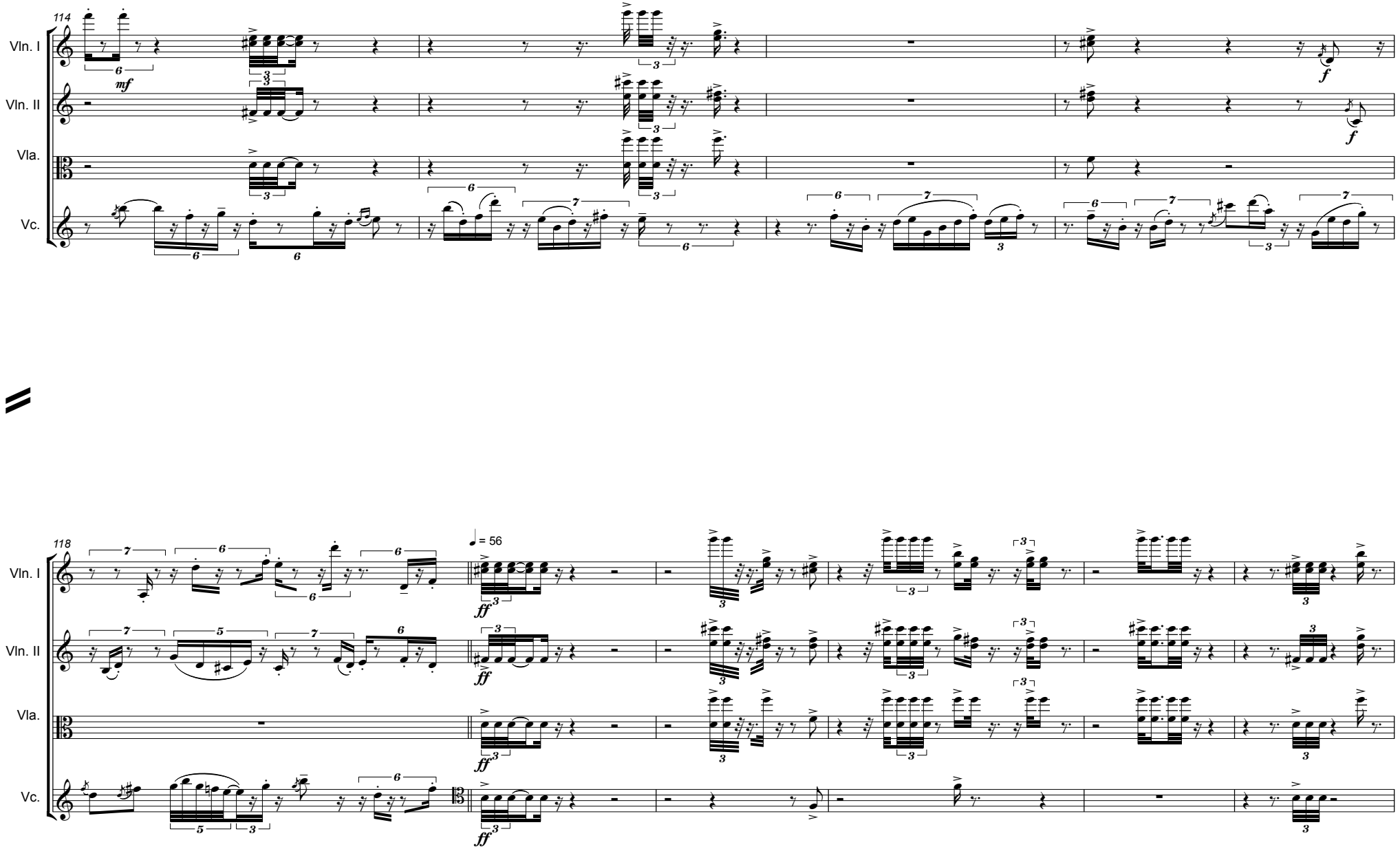

Tempo giusto in c.l.b.r.
71
Vln. I
Vln. II
molto sul tasto
Vla.
molto sul pont.
molto sul tasto
pos. ord.
molto sul pont.
I & II
II & III
III & IV
I &II
ric.
f

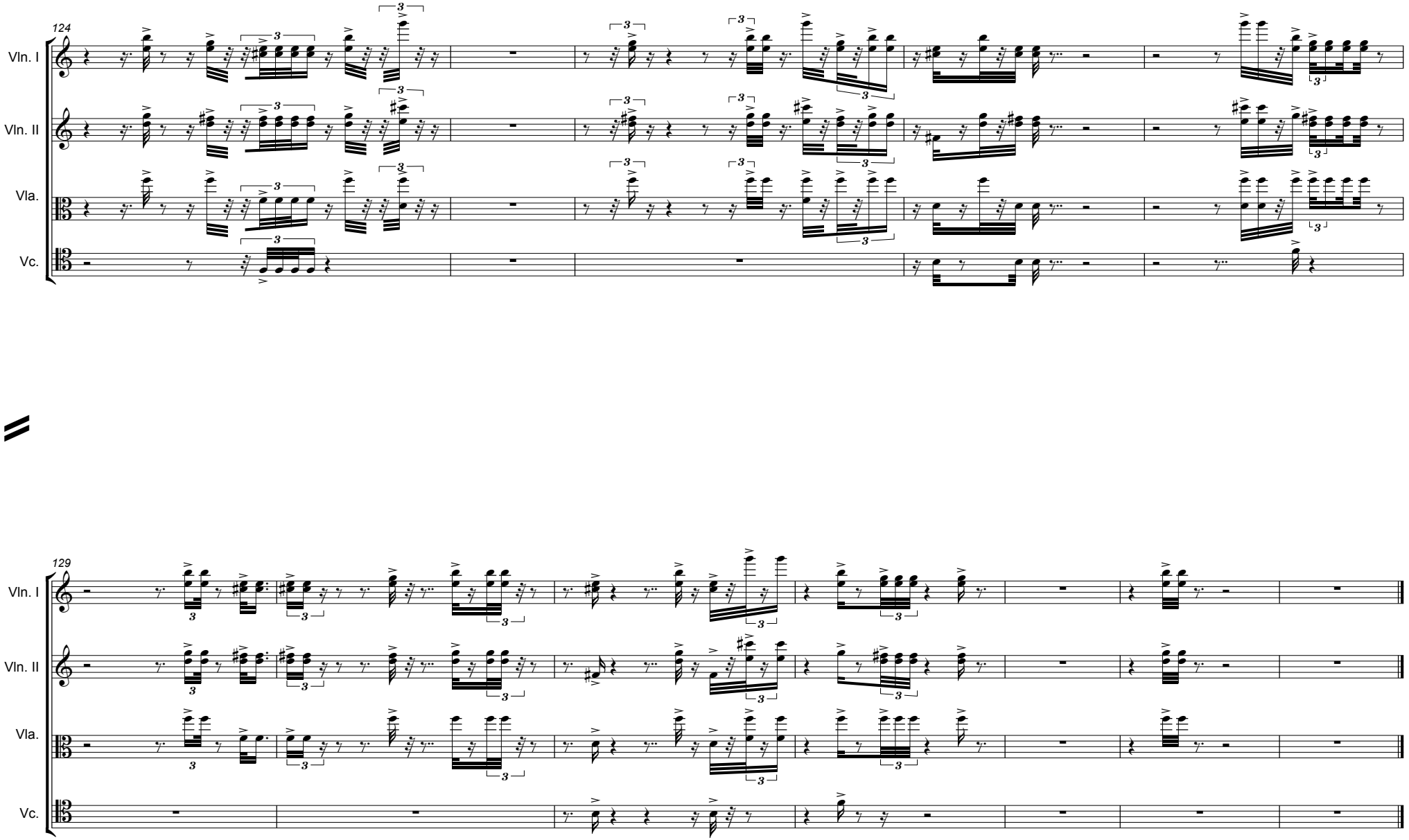

76
Vln. I
Vln. II
Vla.
Vc.
I & II
II & III
III & IV
ric.
arco
mp
f


81
Vln. I
Vln. II
Vla.
Vc.
= 120
= 80
molto sul tasto
pos. ord.
molto sul pont.
I & II
gliss.
ric.
nat.
85


91
Vln. I
Vln. II
Vla.
Vc.
ric.
♩= 80
98
dim.


103
Vln. I
Vln. II
Vla.
Vc.
ric.
108

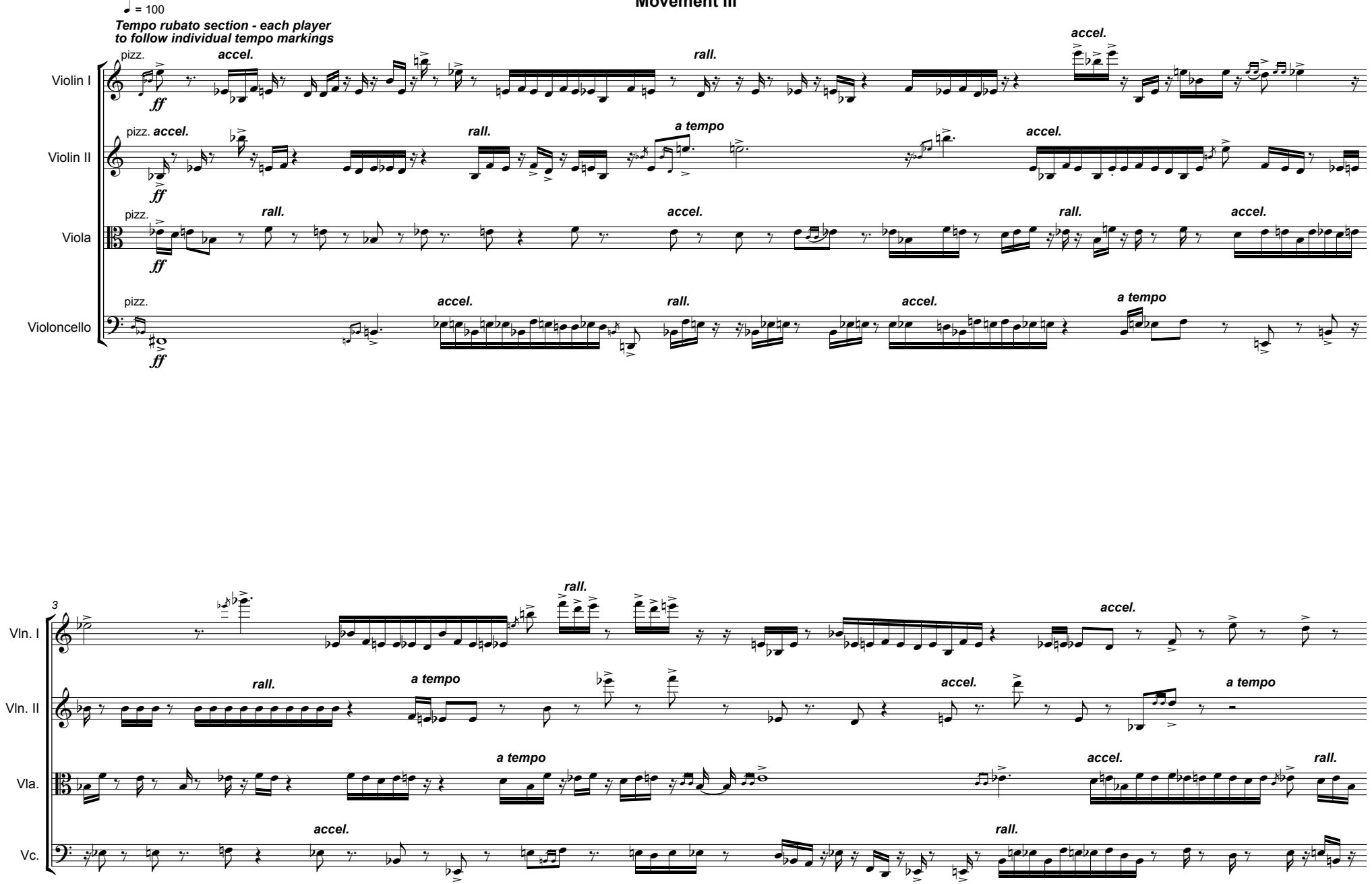

114
Vln. I
Vln. II
Vla.
Vc.
mf
f
118
♩ = 56
ff

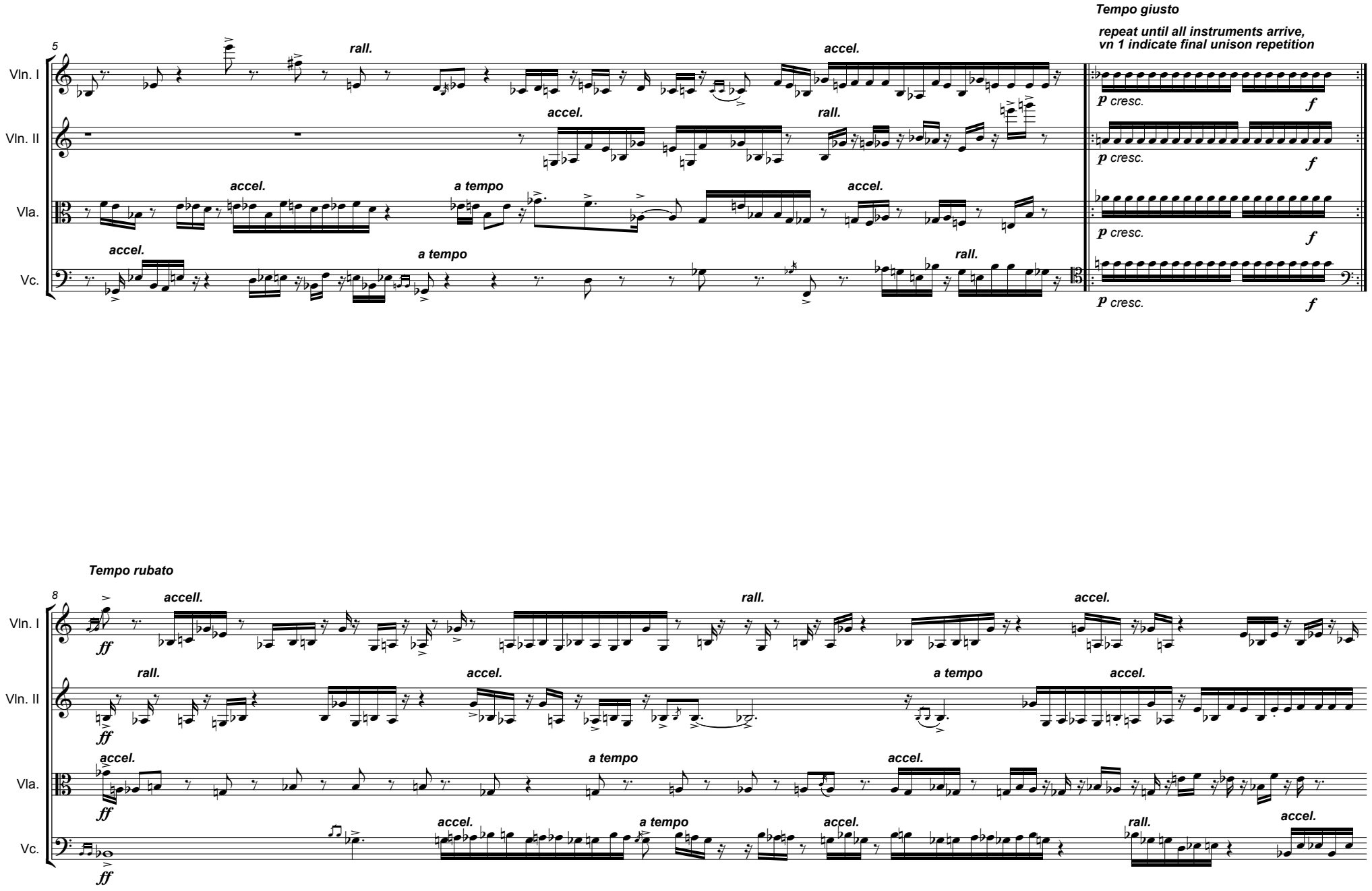

124
Vln. I
Vln. II
Vla.
Vc.
129
Vln. I
Vln. II
Vla.
Vc.

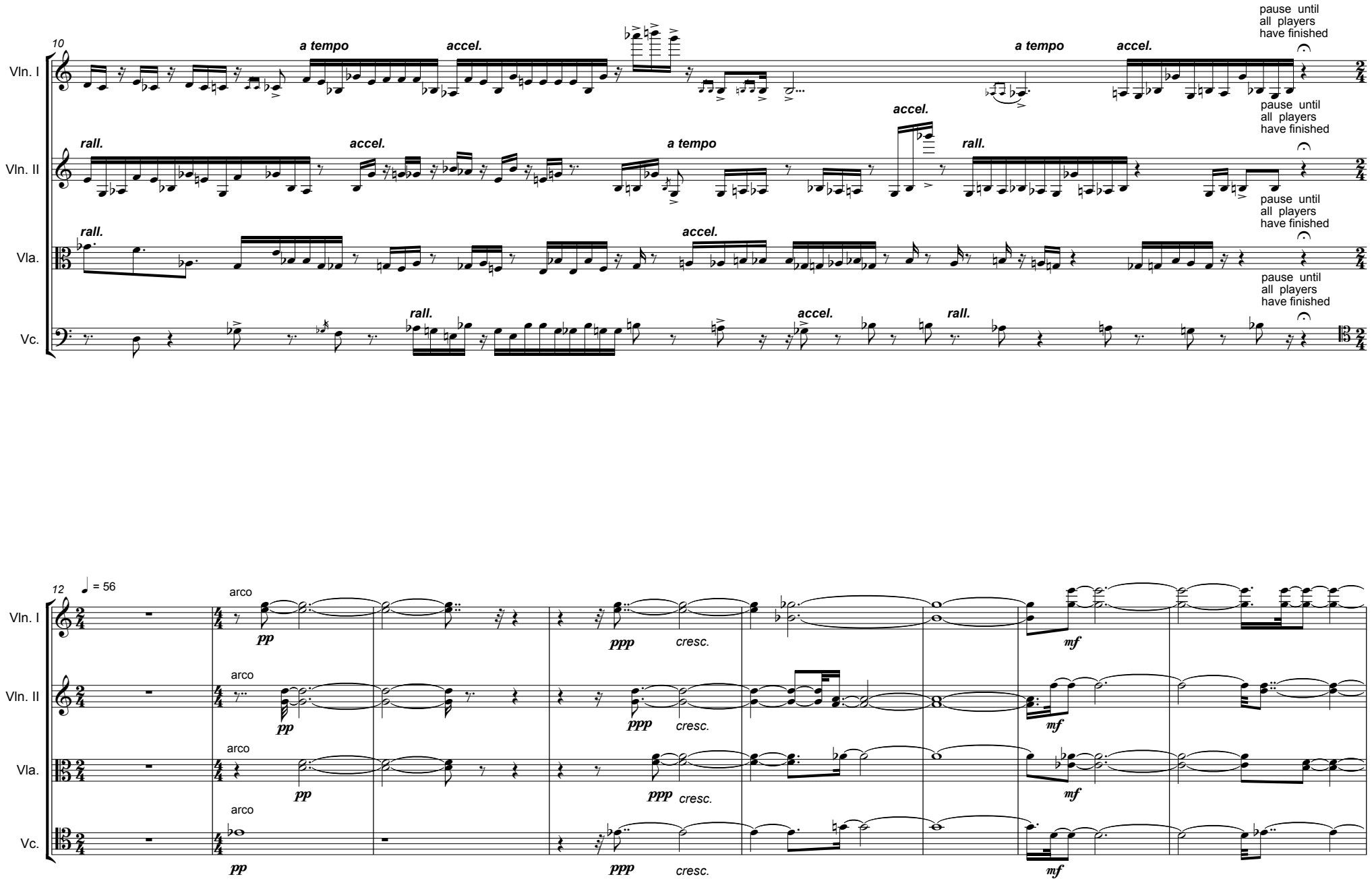
Movement III

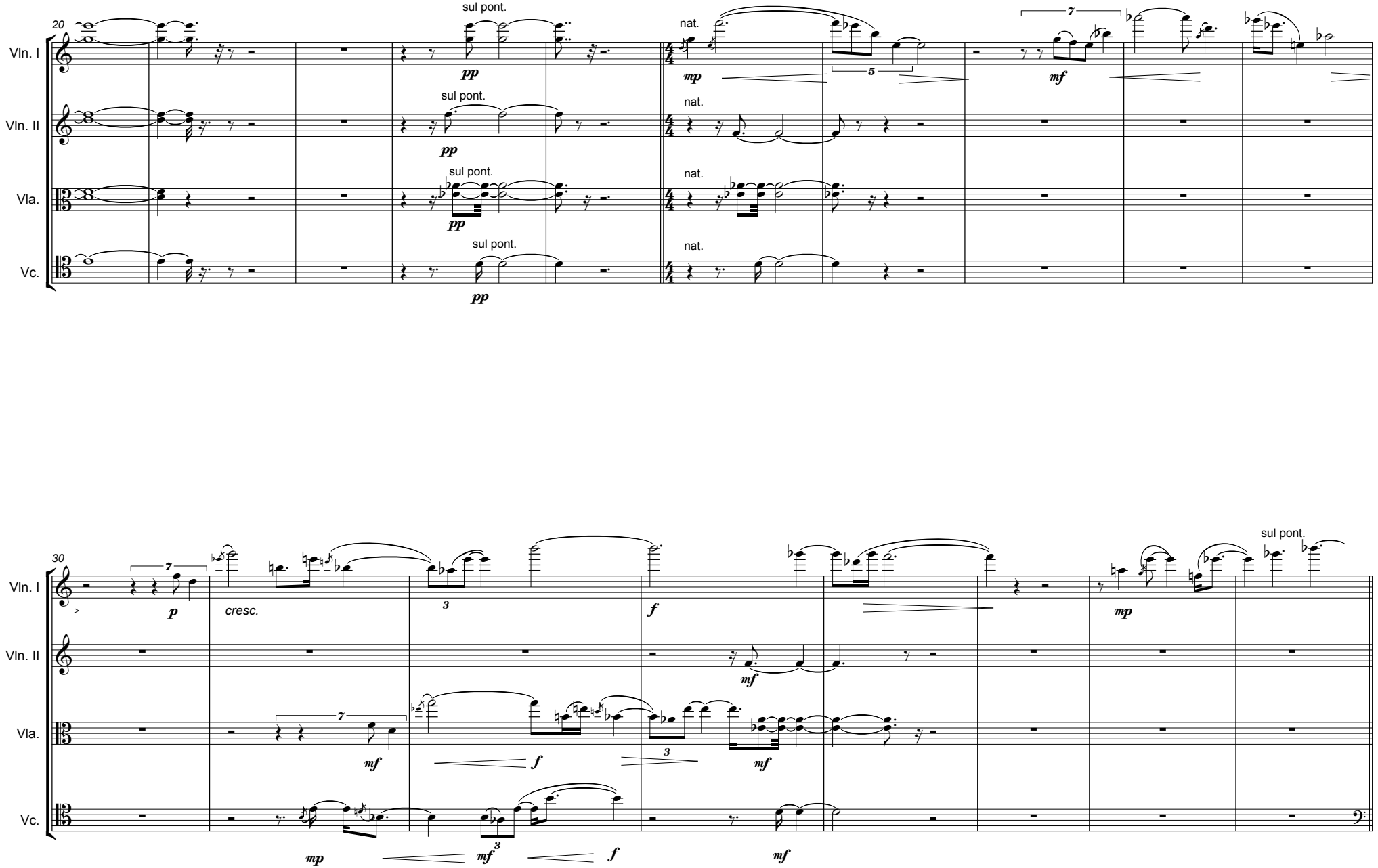
♩ = 100

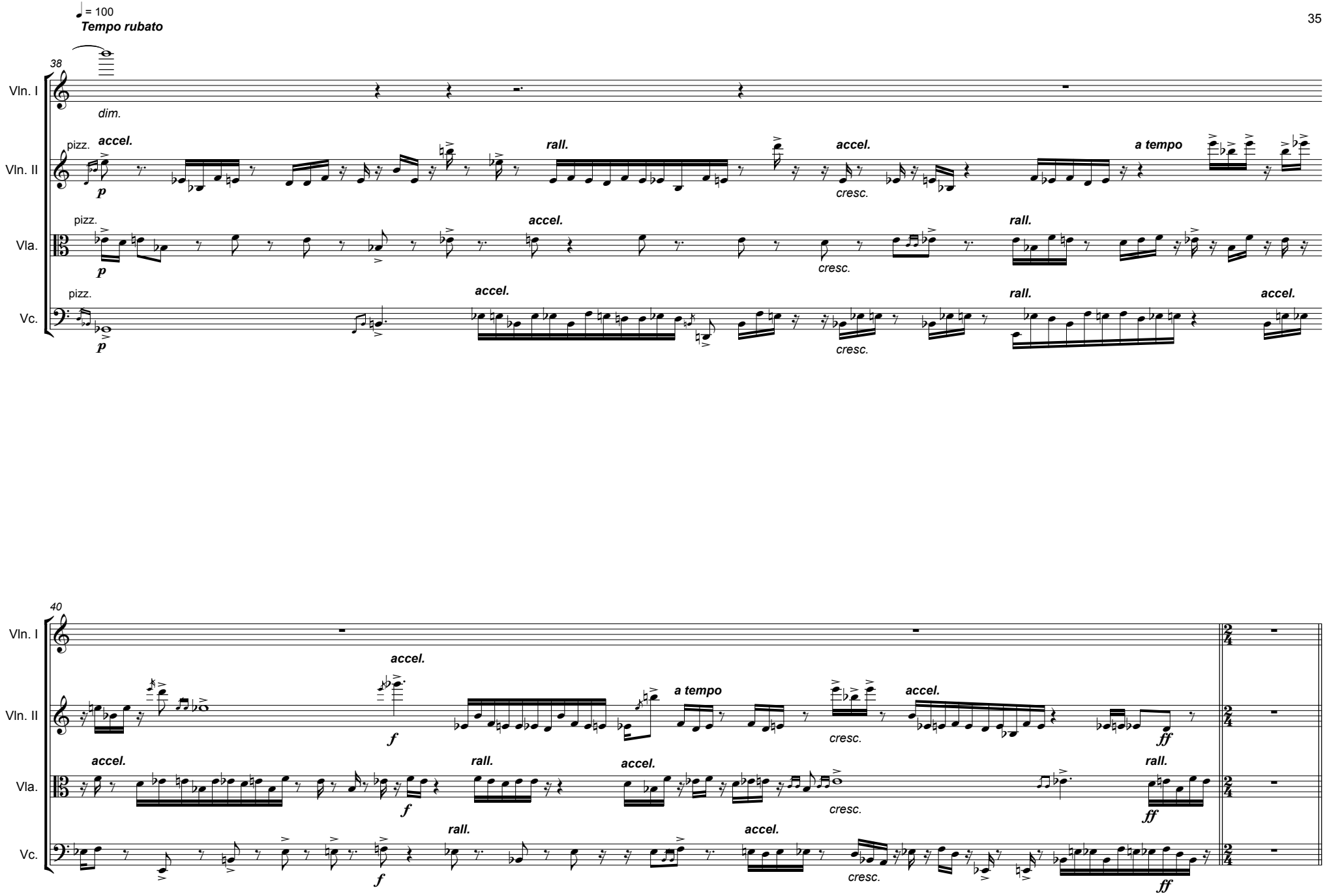
Tempo rubato section - each player to follow individual tempo markings

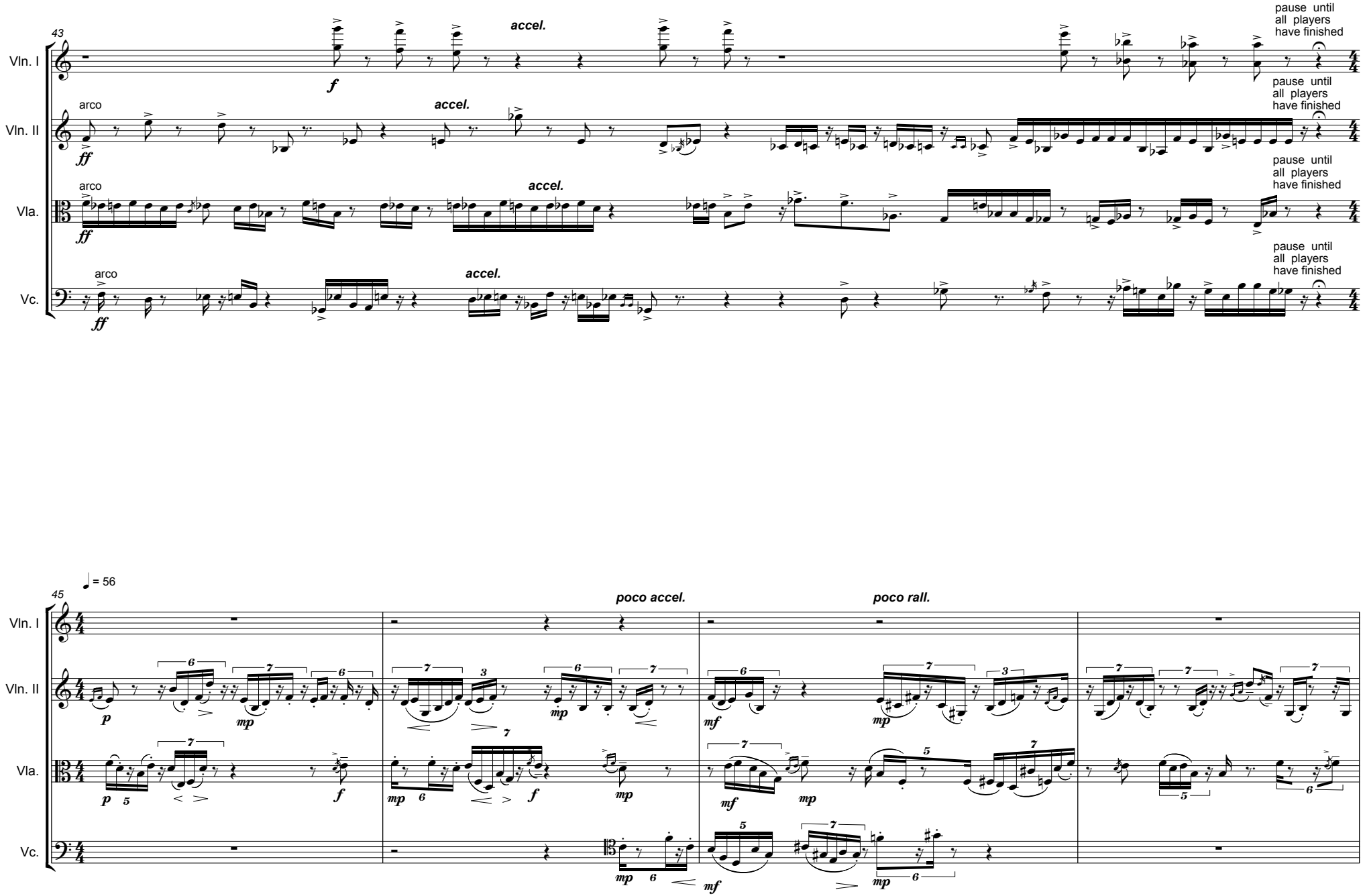


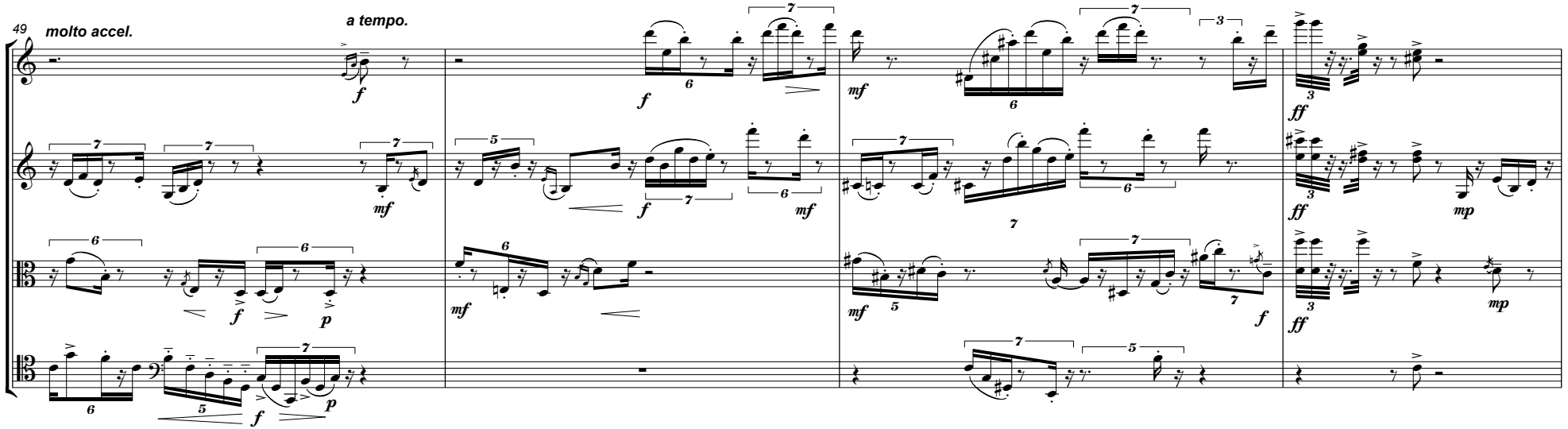

5
Vln. I
Vln. II
Vla.
Vc.
rall.
accel.
accel.
rall.
accel.
a tempo
accel.
accel.
a tempo
rall.
Tempo giusto
repeat until all instruments arrive,
vn 1 indicate final unison repetition
p cresc.
f
p cresc.
f
p cresc.
f
p cresc.
f
8
Tempo rubato
accell.
rall.
accel.
ff
rall.
accel.
a tempo
accel.
ff
accel.
a tempo
accel.
ff
accel.
a tempo
accel.
rall.
accel.
ff

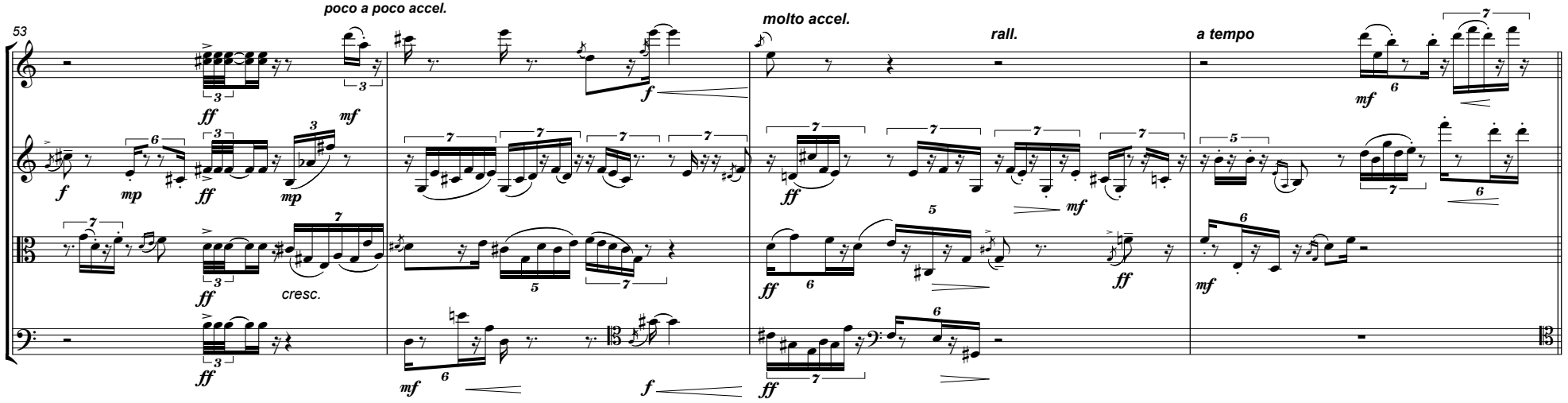

10
Vln. I
Vln. II
Vla.
Vc.
a tempo
accel.
rall.
pause until all players have finished
12
♩ = 56
arco
pp
ppp
cresc.
mf

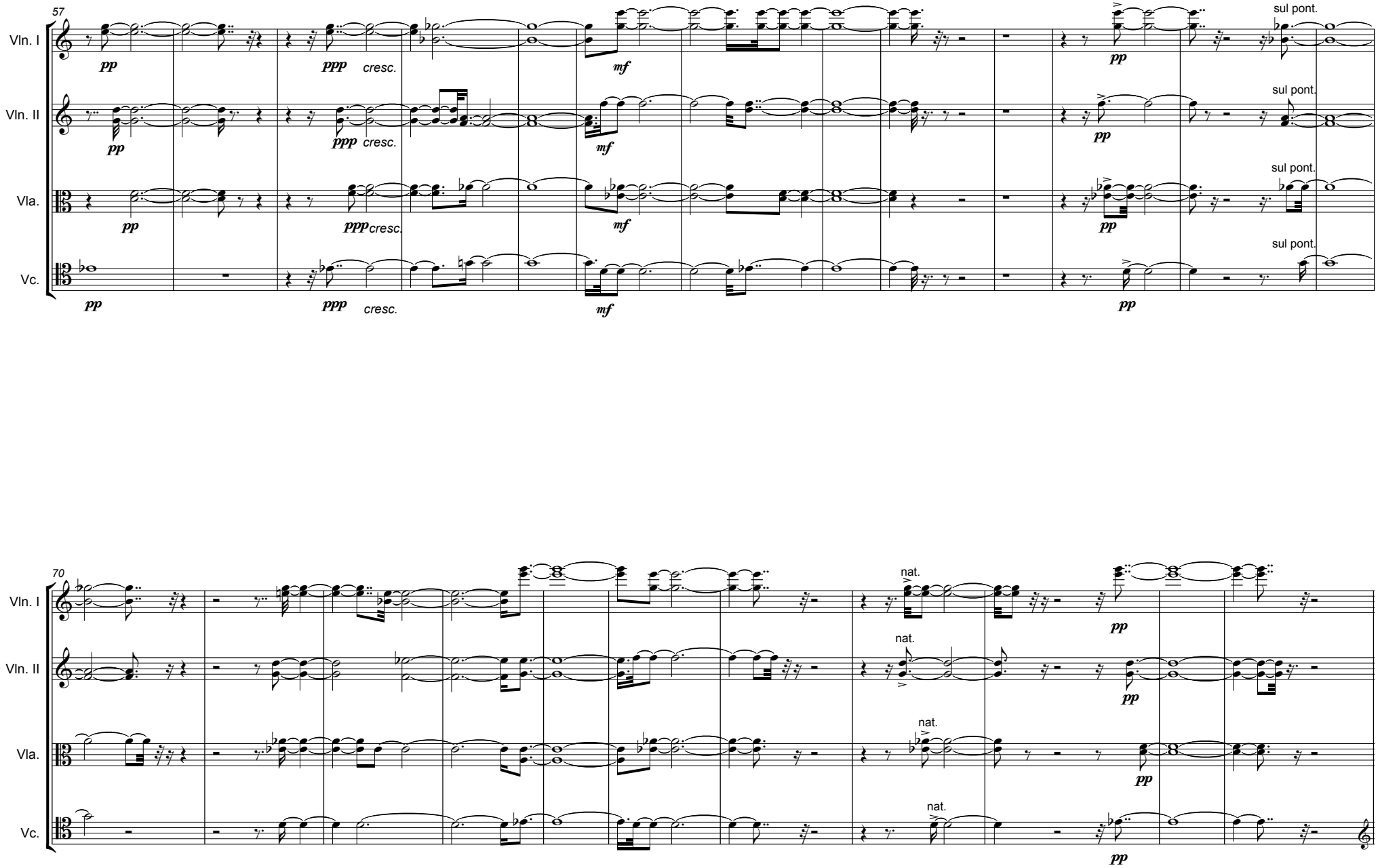

20
Vln. I
Vln. II
Vla.
Vc.
sul pont.
pp
nat.
mp
mf
7
5
30
p
cresc.
3
f
mf
sul pont.

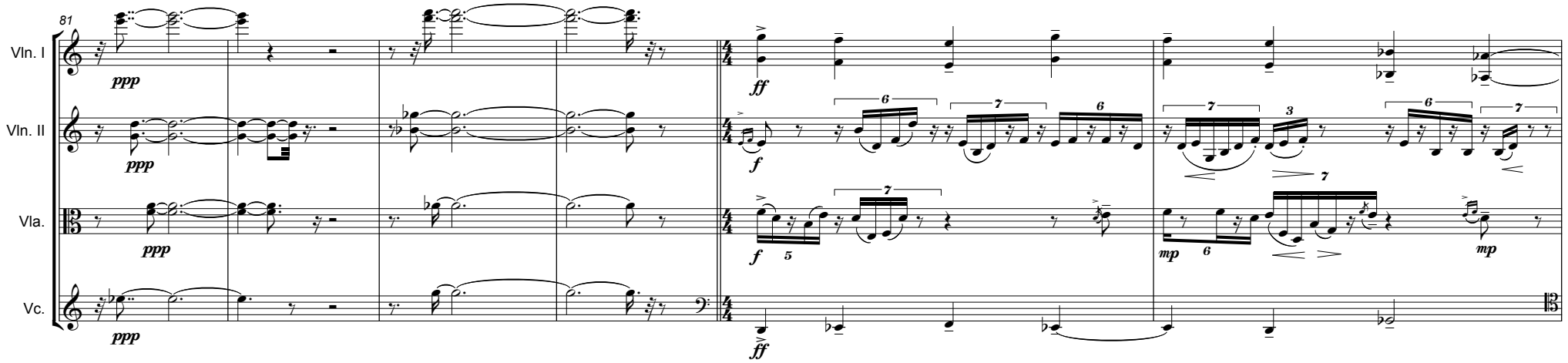

♩ = 100
Tempo rubato
38
Vln. I
Vln. II
Vla.
Vc.
dim.
pizz.
accel.
rall.
a tempo
cresc.
p
40
f
ff

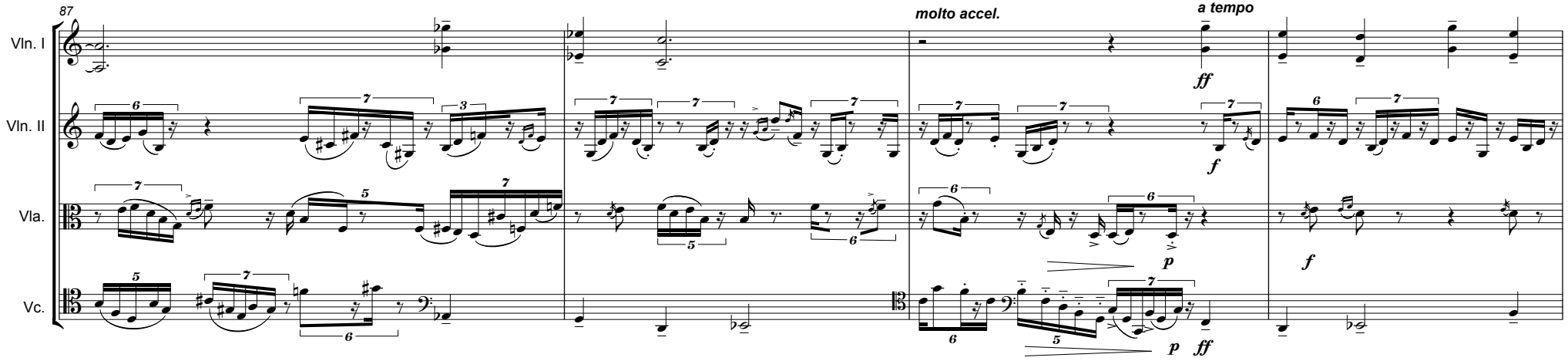

43
Vln. I
Vln. II
Vla.
Vc.
arco
accel.
pause until all players have finished
45
♩ = 56
poco accel.
poco rall.

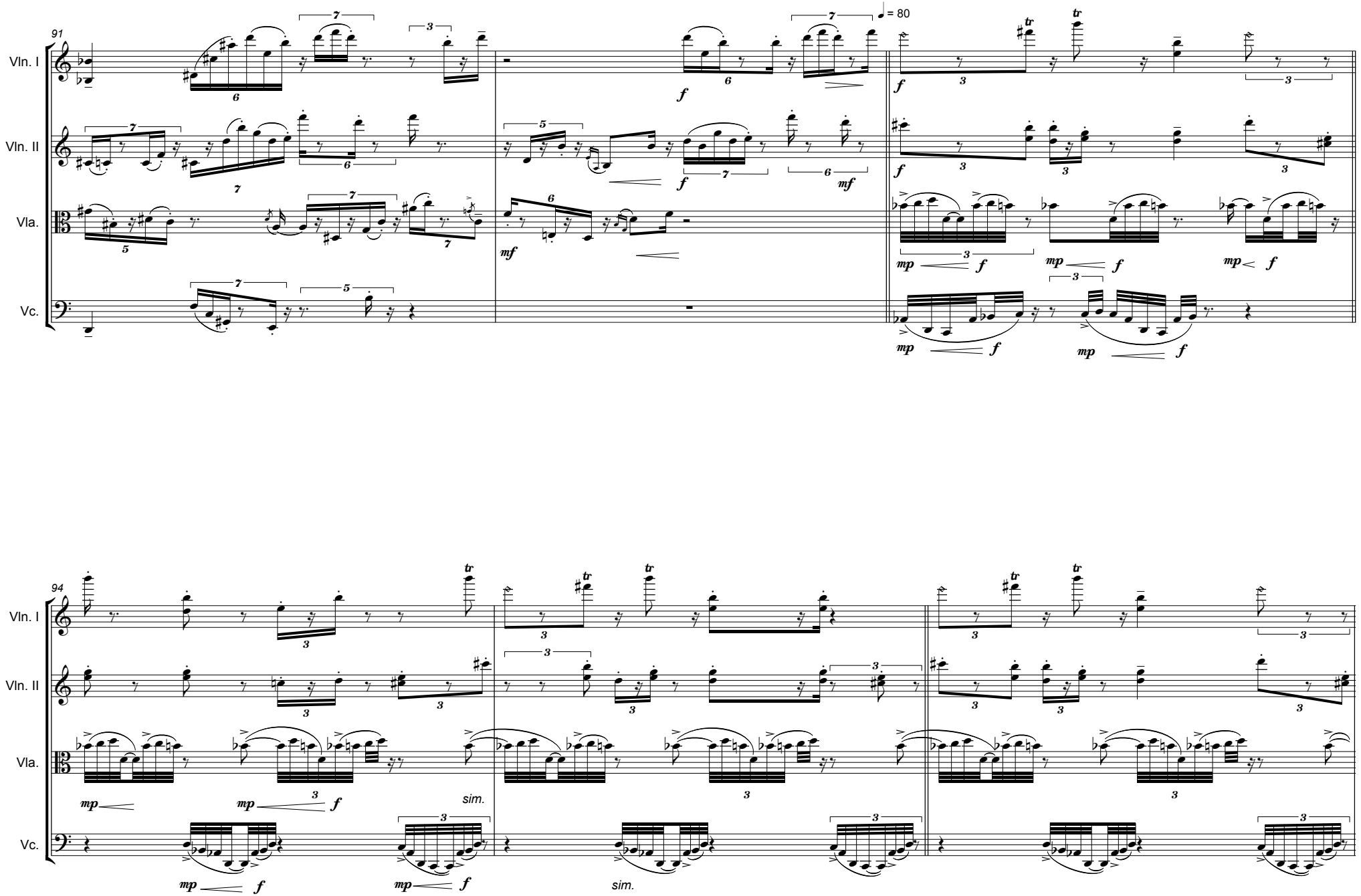

49
molto accel.
a tempo.
Vln. I
Vln. II
Vla.
Vc.

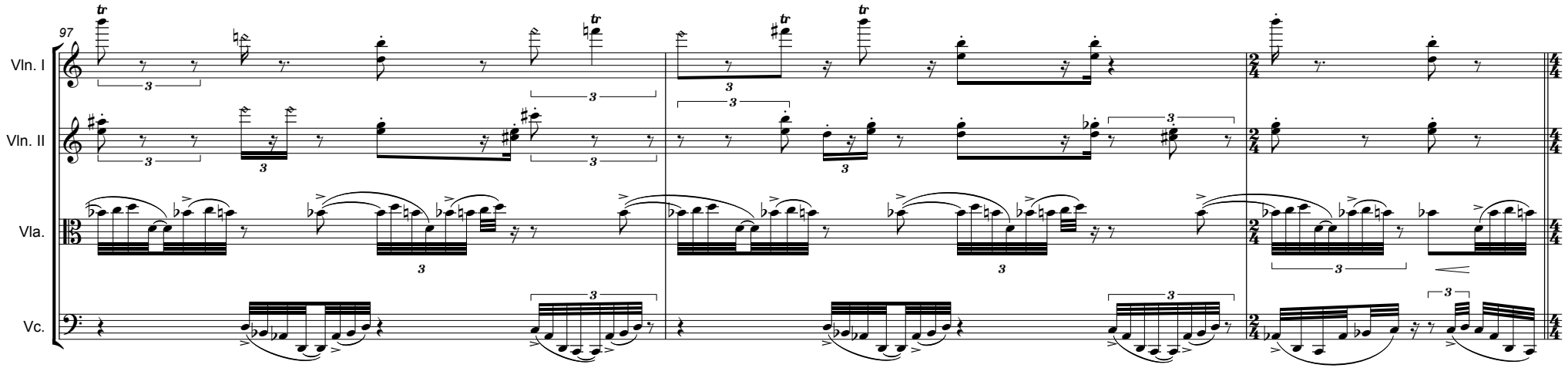

53
poco a poco accel.
molto accel.
rall.
a tempo
cresc.
Vln. I
Vln. II
Vla.
Vc.

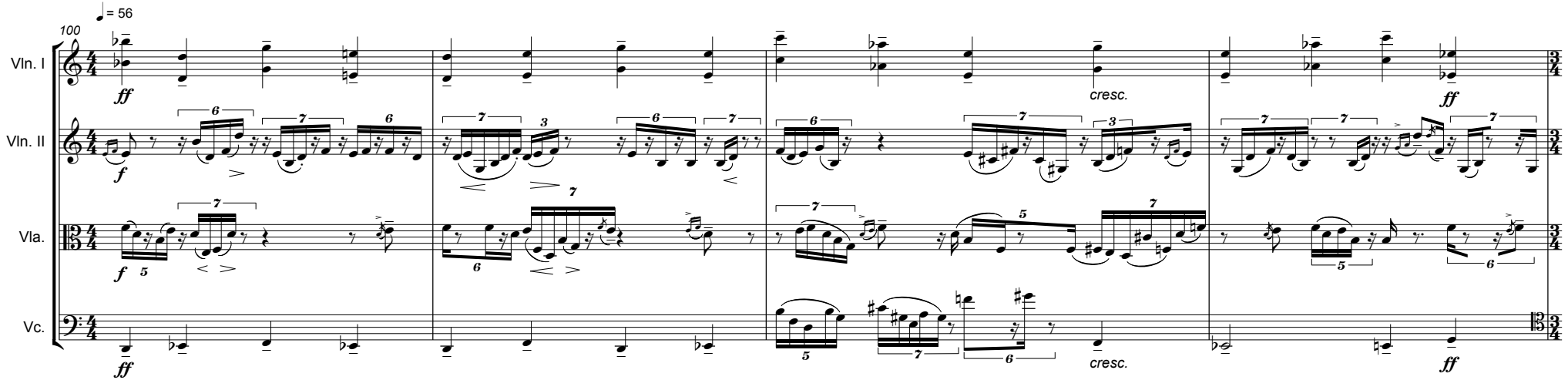

57
Vln. I
Vln. II
Vla.
Vc.
pp
ppp
cresc.
mf
sul pont.
70
nat.

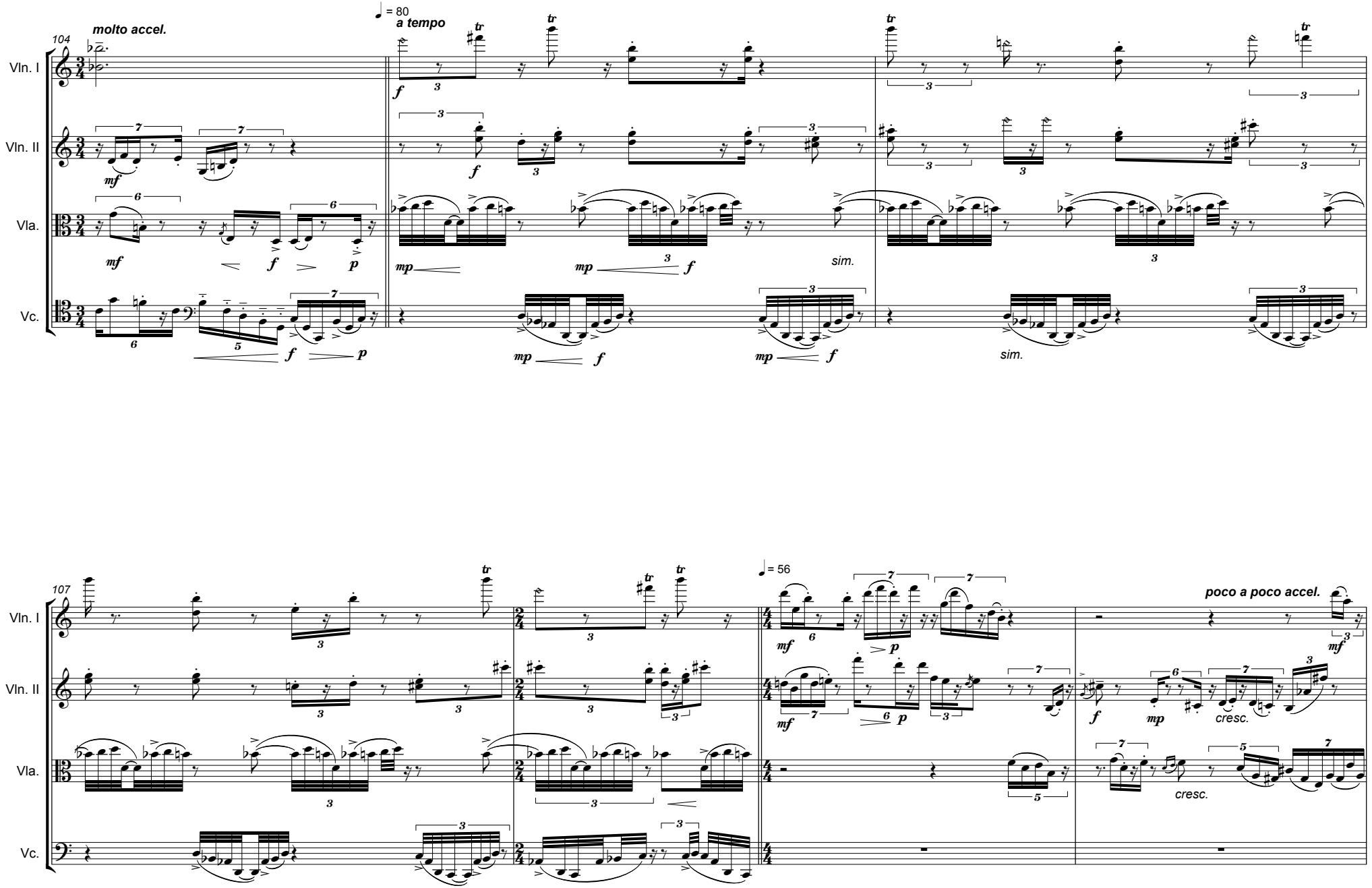

81
Vln. I
Vln. II
Vla.
Vc.
ppp
ff
f
mp

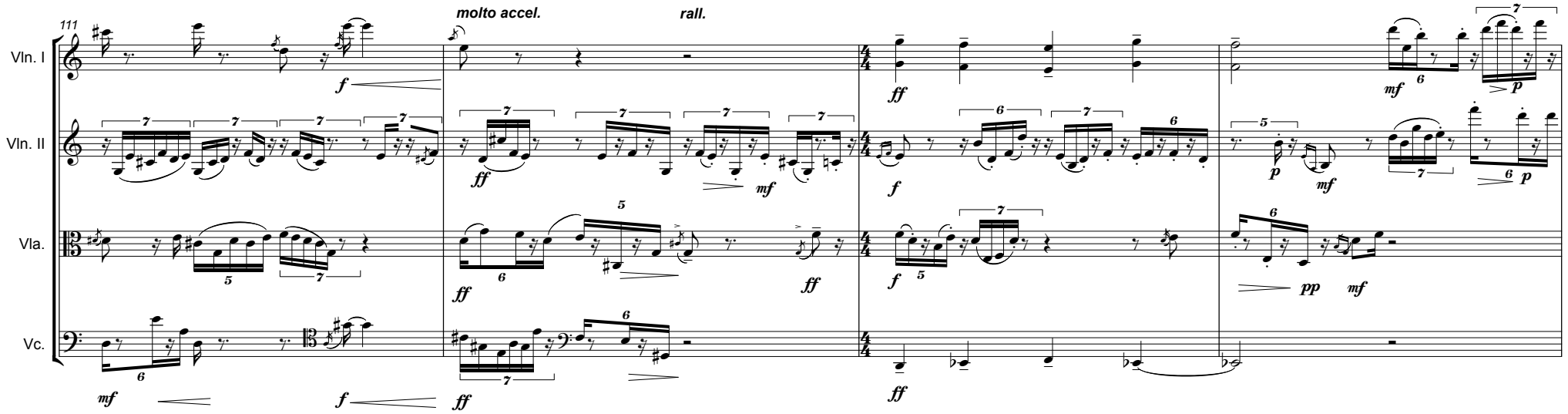

87
molto accel.
a tempo
Vln. I
Vln. II
Vla.
Vc.
ff
f
p

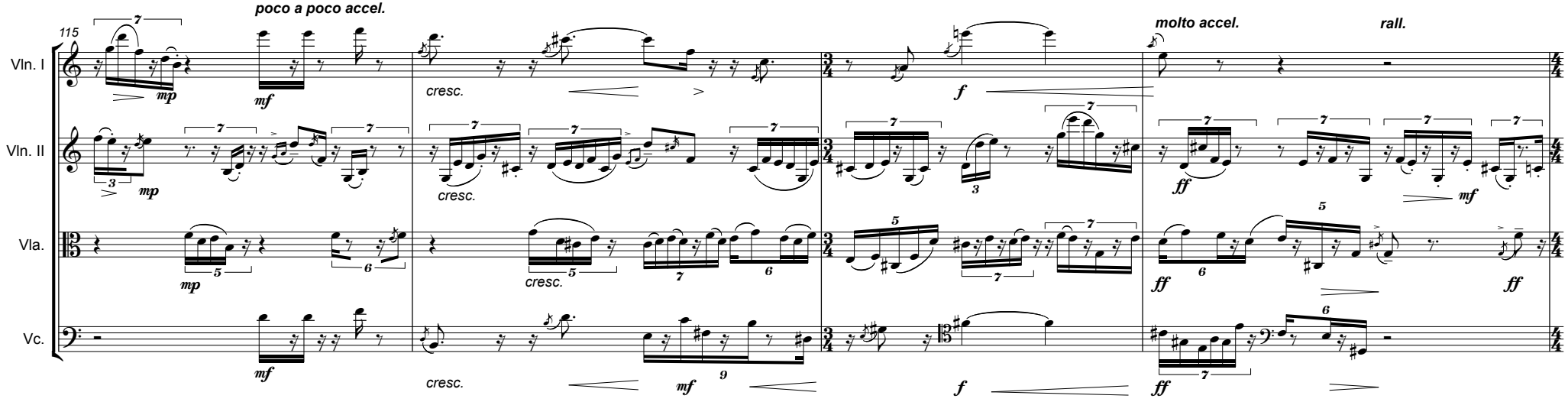

91
Vln. I
Vln. II
Vla.
Vc.
♩ = 80
94
sim.
sim.

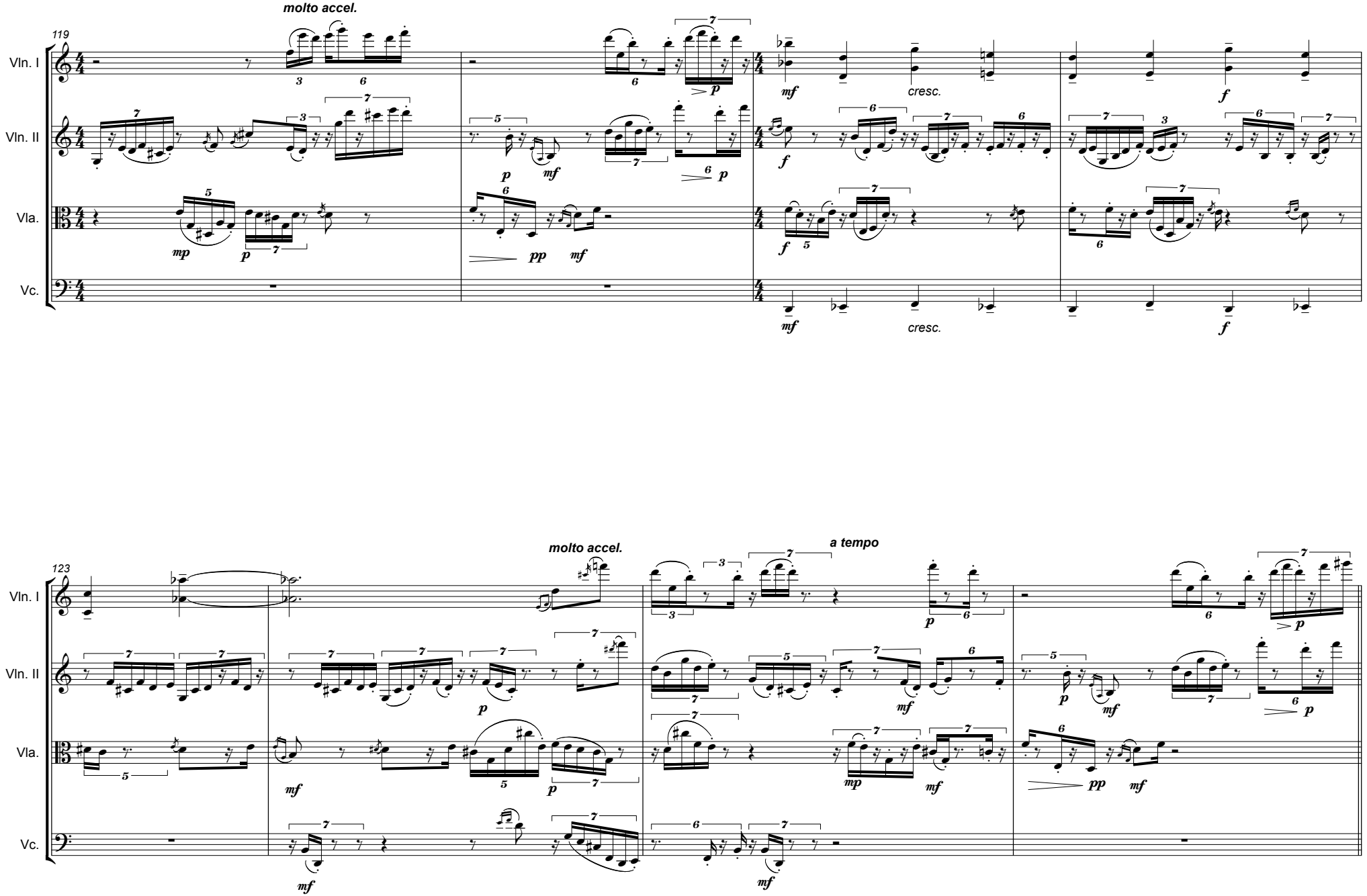

97
Vln. I
Vln. II
Vla.
Vc.

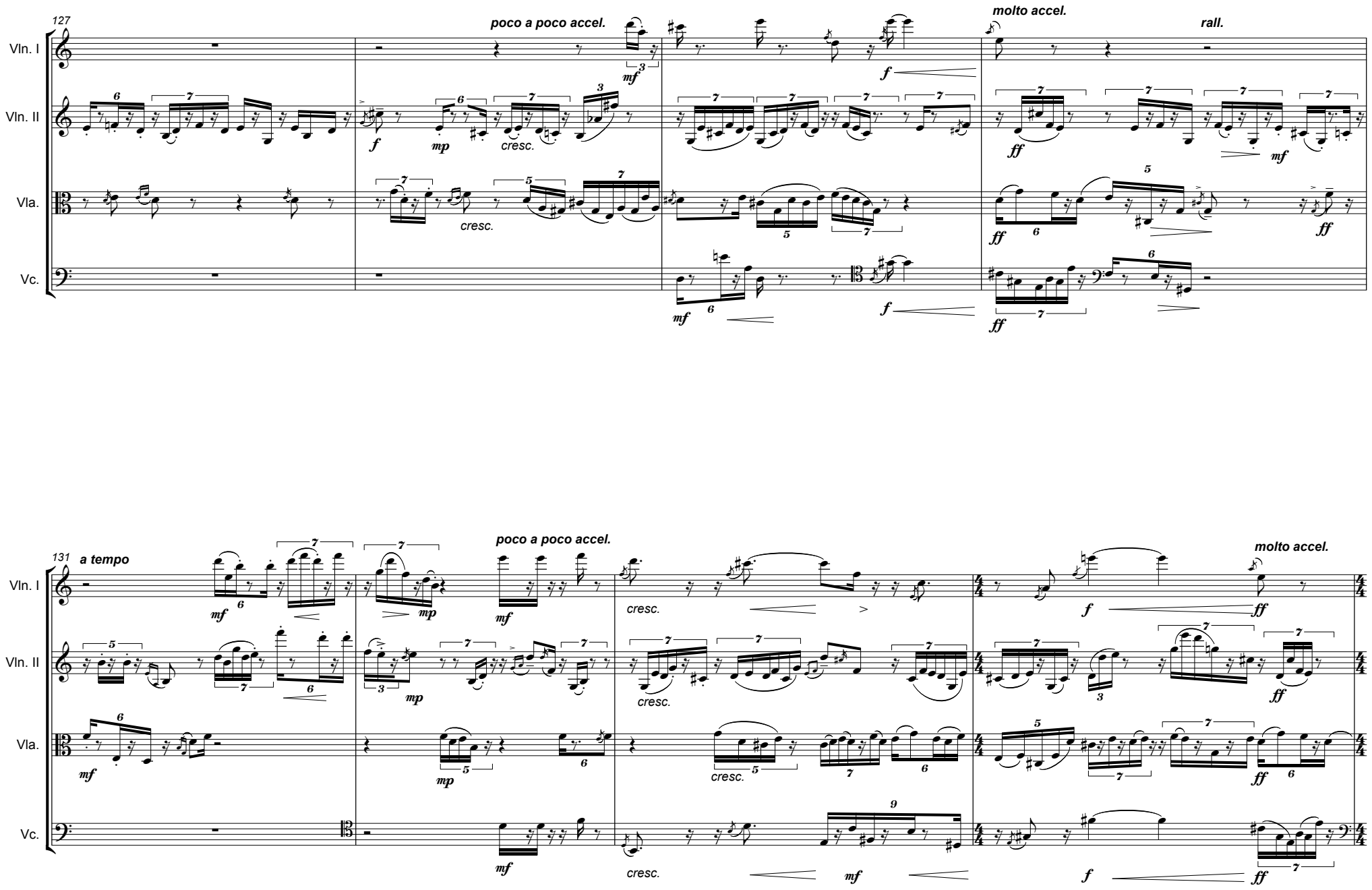

100
♩ = 56
Vln. I
Vln. II
Vla.
Vc.
ff
f
cresc.
cresc.
ff
ff

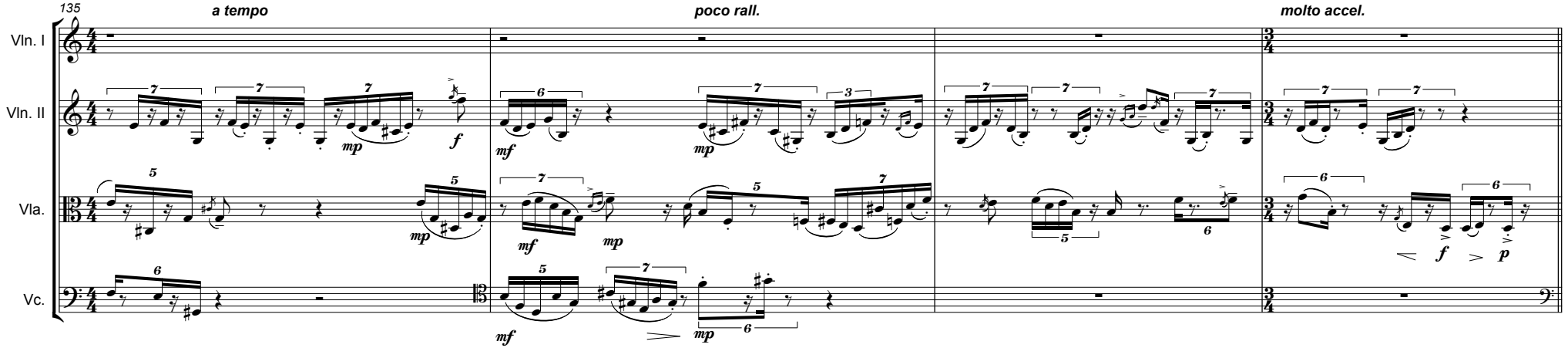

molto accel.
104
♩ = 80
a tempo
Vln. I
Vln. II
Vla.
Vc.
sim.
sim.
107
♩ = 56
poco a poco accel.
cresc.
cresc.

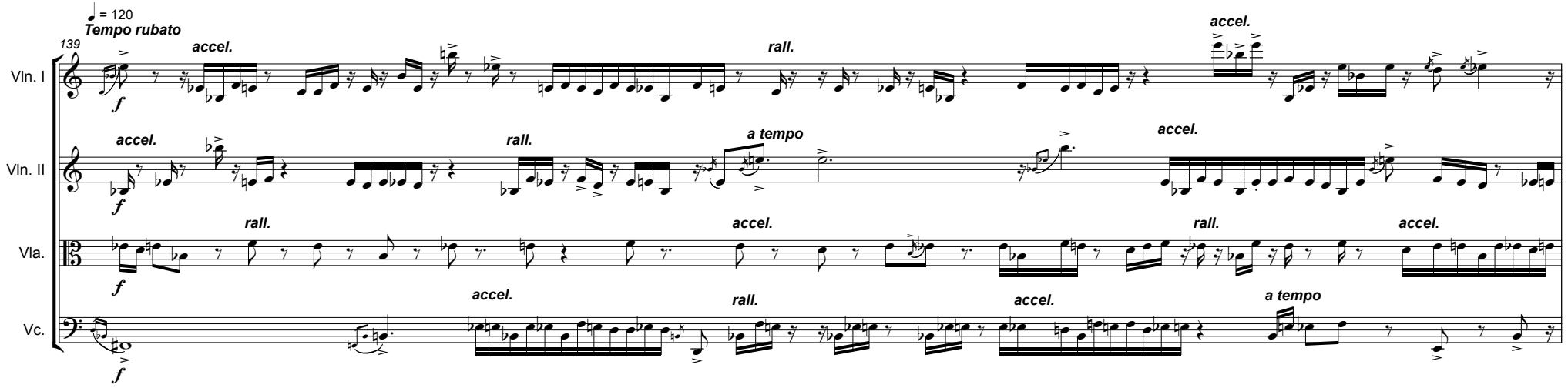

111
molto accel.
rall.
Vln. I
Vln. II
Vla.
Vc.

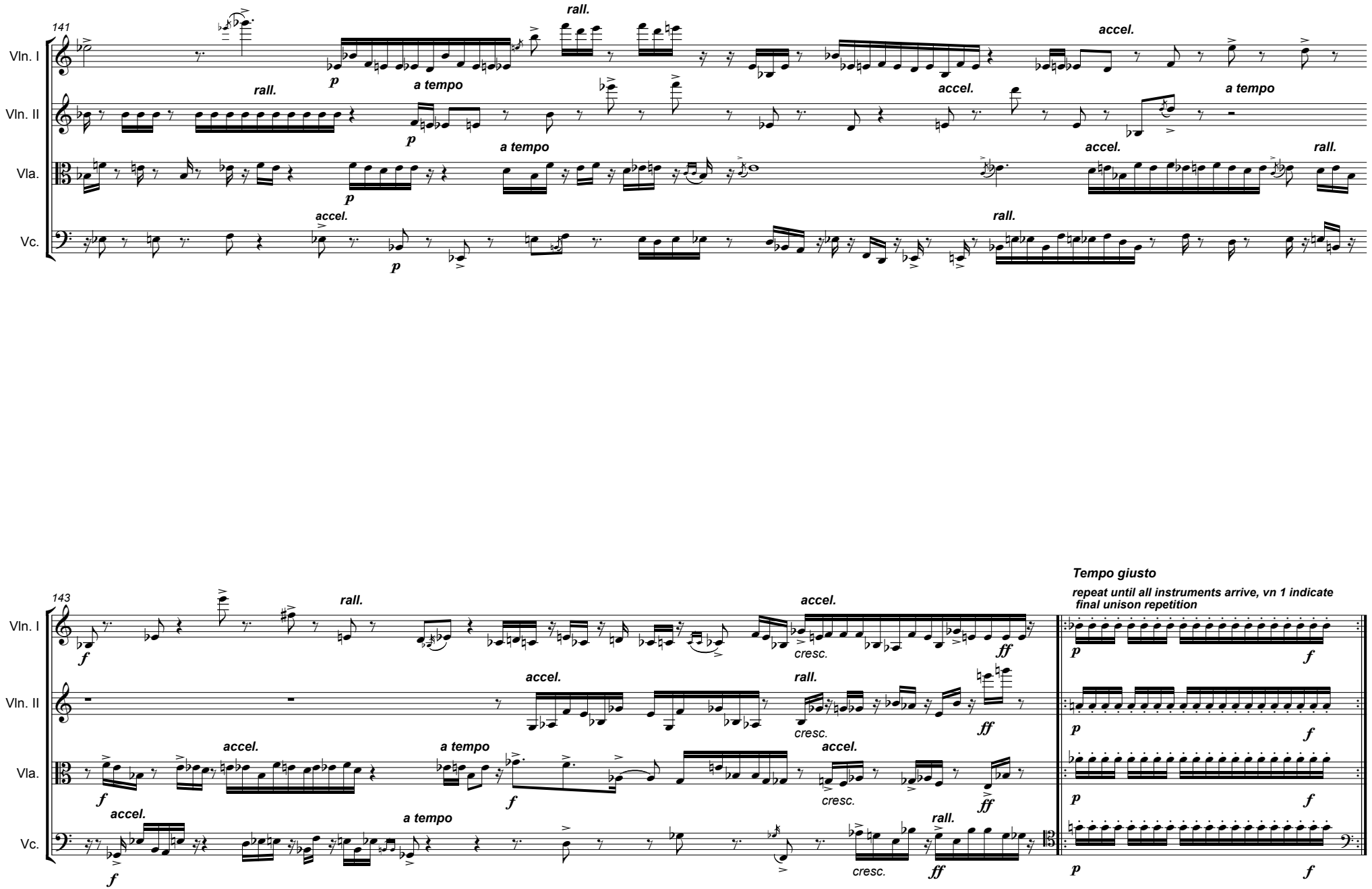

115
poco a poco accel.
molto accel.
rall.
cresc.
Vln. I
Vln. II
Vla.
Vc.

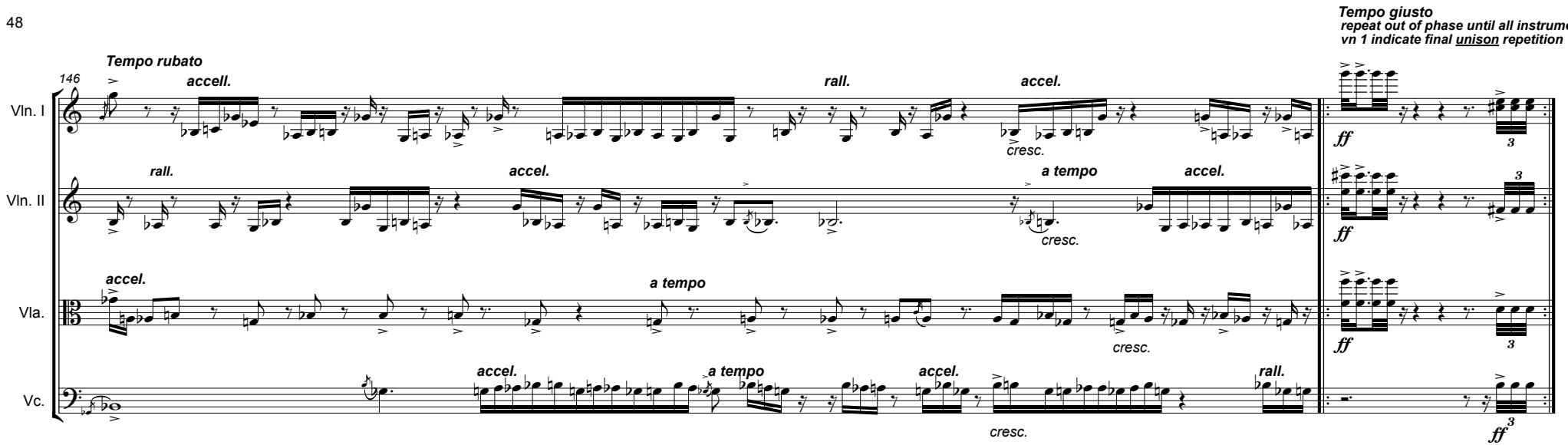

molto accel.
119
Vln. I
Vln. II
Vla.
Vc.
cresc.
cresc.
molto accel.
a tempo
123

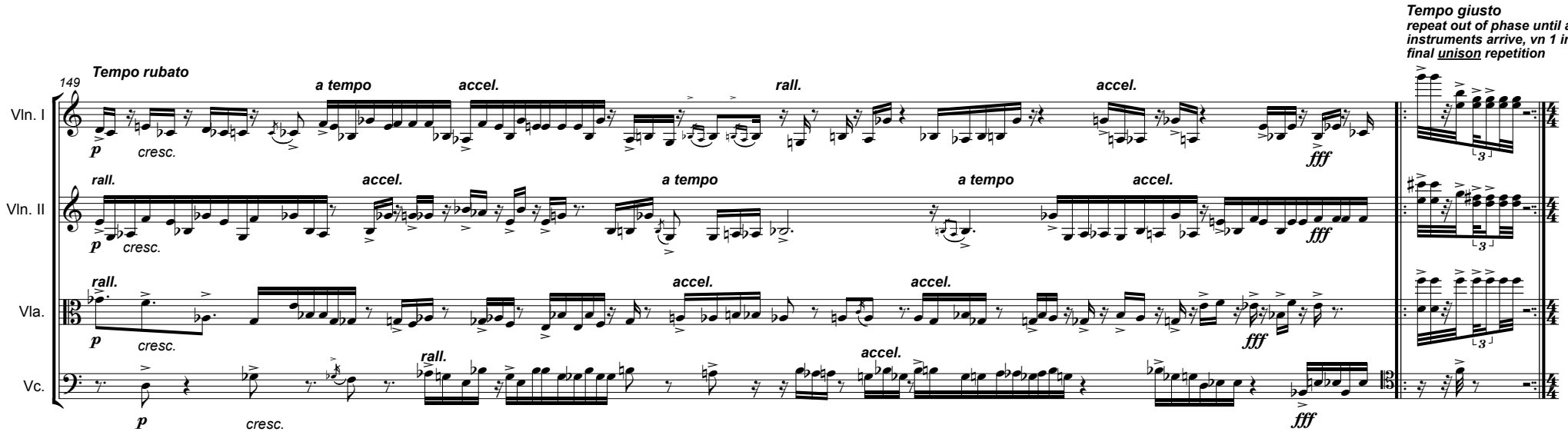

127
poco a poco accel.
molto accel.
rall.
Vln. I
Vln. II
Vla.
Vc.
131
a tempo
poco a poco accel.
molto accel.
cresc.

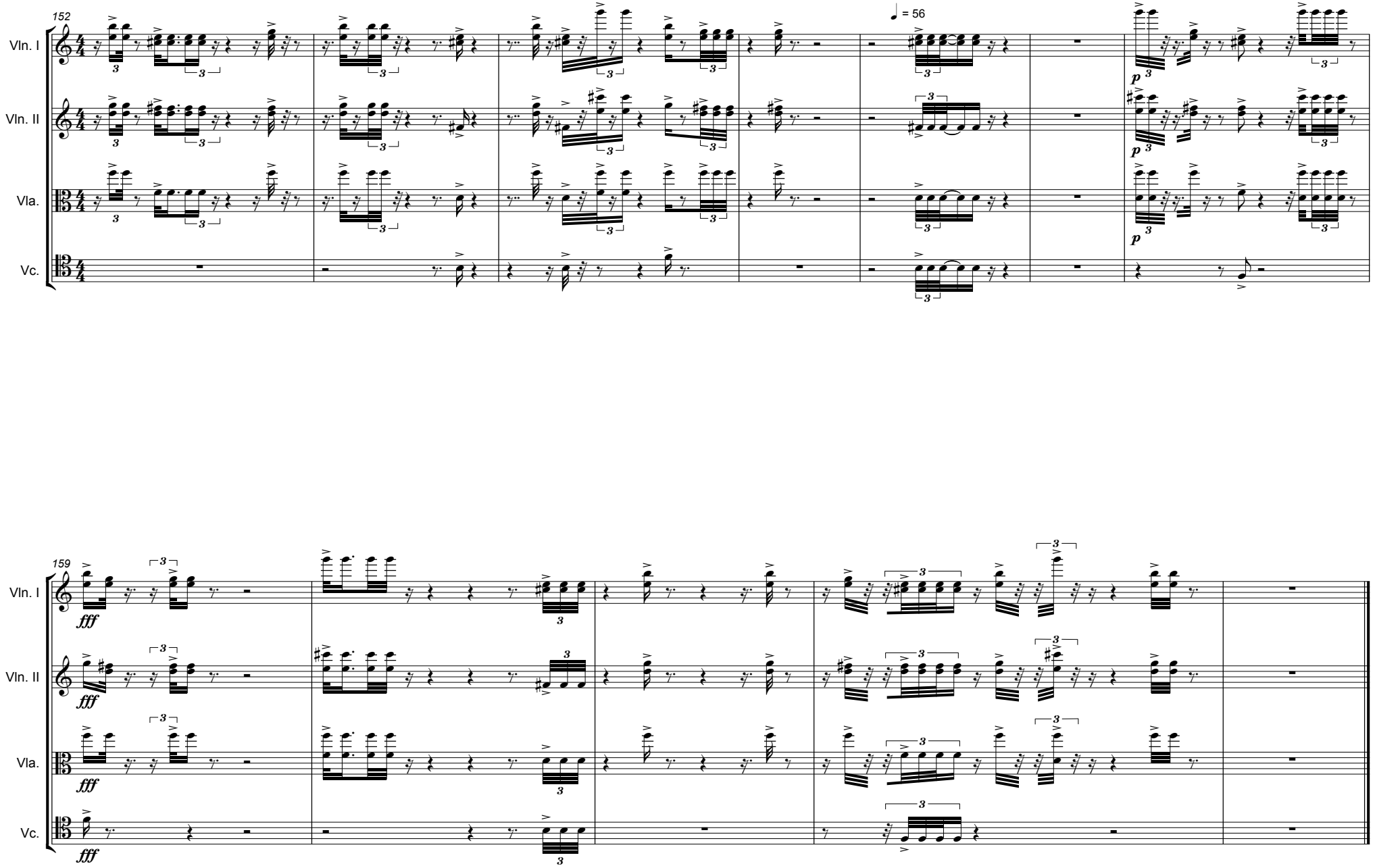

135
a tempo
poco rall.
molto accel.
Vln. I
Vln. II
Vla.
Vc.


♩ = 120
Tempo rubato
139
accel.
rall.
accel.
a tempo
Vln. I
Vln. II
Vla.
Vc.


141
Vln. I
Vln. II
Vla.
Vc.
rall.
a tempo
accel.
p
143
cresc.
ff
f
Tempo giusto
repeat until all instruments arrive, vn 1 indicate final unison repetition


Tempo giusto
repeat out of phase until all instruments arrive, vn 1 indicate final unison repetition
146
Tempo rubato
accell.
rall.
accel.
Vln. I
Vln. II
Vla.
Vc.
cresc.
a tempo
ff


Tempo giusto
repeat out of phase until all instruments arrive, vn 1 indicate final unison repetition
149
Tempo rubato
a tempo
accel.
rall.
Vln. I
Vln. II
Vla.
Vc.
cresc.
p
fff


152
Vln. I
Vln. II
Vla.
Vc.
♩ = 56
p
159
fff

What is the creative role of the listener of music and why is it important?

The creative role of the listener of music is a crucial one, which does not begin and end with the duration of the music. Without the constructive element of the listener music as we understand does not exist. By examining issues surrounding the creative role of listening, and in particular two related articles by Daniel A Putman and Jean Francois Lyotard, it is clear that what is of greater significance is not what is created by the listener of music, but what is created by the listening process, and the impact of the listening process on the individual.

Listening to music begins long before the performance begins. We have been listening since the day of our birth, our understanding of music is formed by modest experiences at first; meaning in speech conveyed with pitch, dynamics, articulation and rhythm, and later, simple songs sung by our family members and teachers, awareness of musical characteristics in the natural world, music in advertising, music on the radio and television, televised and live performances, and so on. We are born into a wealth of music and sound. A musical history is created by the absorption of these sounds. Fragments of musical experiences, of those used for communication, of tradition and environment are entwined with fragments of the experiences of the listening choices we have made. This complex form, which is at the core of our listening process, informs our belief in what music happens to be.

This complex of changing, colliding fragments which we can call our musical history is brought to bear on any listening experience of music. Before the first strains of music alight our senses in performance we have already decided (chosen) that what we are waiting to hear is music of some sort, as opposed to a succession of unconnected sonic events[1]. Having constructed a certain amount of the piece already, we feel that these sonic happenings are related by virtue of the situation: we have come to listen to music. All sonic material has one or multiple characteristics that we perceive music to have; a rhythm, pitch, dynamic, an articulation, and so on. The every day sounds we hear as we walk down the street are transformed when recorded and listened to as a piece of

[1] Thomas G. Miller, 'On Listening to Music', The Journal of Aesthetics and Art Criticism, Vol. 52, No. 2. (Spring, 1994), pp.216.

music, or rather, they transform us, because while the sonic material stays the same, we unconsciously create the relationships between the individual sounds that we hear, or gain new insight into the properties of a familiar sound when we identify musical characteristics.

There are a number of states of listening but not listening to music, and these affect what the listener creates and what is created by the listening process in various ways. Believing we are listening without truly hearing and grasping the fine essence of the music is a common condition. The mind may be sprightly and aware, but we may hear concepts of music rather than the source[2]. A recognition of a certain style of music, a use of instrumentation, of a positioning in a chronological or developmental sequencing may be useful information in some contexts, and even produce a pleasurable emotional reaction from the act of recognition, but this is reflective listening; the purity of the music is unable to penetrate the mirroring habits of the mind. This type of listening, while expanding a knowledge of how concepts of music apply to its practice, prevents the alteration of the listener's musical history. Distraction while listening, actively thinking or doing something else while music is playing is risky. In this instance we cannot possibly truly hear the essence of the music, and a vague recognition of certain conceptual elements may lead us to believe that we have received the communication of the piece. The listener hears what he/she wants to hear; what he/she already knows, thus confirming preconceived ideas of what music is, and denying the possibility of a belief changing experience. Choosing not to grant attention to music which seems to contain neither an intriguing, indefinable element, nor an emotional nor intellectual experience is also risk-laden. This involves a rational 'goal-orientated' thinking[3], where the desired effect of the listening has already been decided. If the 'goal' of the listener is to hear a moving or unique experience, to be taken to an unexpected place, it cannot be assumed that this can be found in a particular style or genre of music. Of course, some music may be unfocused, inexpressive and seem vulgar to a listener who knows how to listen, yet this listener knows that he/she must

[2] Putman, Daniel A. 'Music and the Metaphor of Touch', The Journal of Aesthetics and criticism, Vol.44, No. 1. (Autumn, 1985).pp. 59-66.
[3] Putman, Daniel A, 'Music and the Metaphor of Touch', The Journal of Aesthetics and Art Criticism, Vol. 44, No. 1. (Autumn, 1985), pp. 59-66.

endure and absorb these experiences in being open in order to be ready to hear those which are exquisite when they appear.

Exquisite sound or otherwise, when the listener is truly listening and is open, unfolded, receptive, accepting of what he/she is adding to his or her own experience, his/her creative role is diminished. What has been created is allowed to be for the duration of the piece, and he/she creates nothing new. Absorbed in sound, straining at the edge of his/her awareness to obtain every detail of what is unfolding, the activity is all encompassing. Time and space are dispersed. Vague emotional reactions may present themselves, existing around the edges and underneath, or leaping violently from the music, confronting the listener with a new articulation of a recognisable emotion. Emotions are a mixture of physical response, psychological characteristics and cognitive function, which are present in a mixture of degrees[4]. When we recognise, or partly recognise our emotional response at the time there is a higher level of cognitive response to the music. This experience of realisation results in a change in the understanding of a conceptual idea of emotion. What the listener hears is what resonates in consonance or against not only his/her understanding of music, but also his/her understanding of the variety and depth of feelings that befall human beings throughout the course of their lives.[5] The real power of music is felt when we are unable to attribute a conceptual label to the experience, when what we feel goes beyond our experience and our ability to define.

Essence in music, that which creates an emotional response, is also a complex form, containing many elements. It is at the crux of what is creative during the listening process; it acts as a catalyst, stirring the listener into action. In the creation of a piece of music the role of the composer (to design the formal aspects of the music in accordance to suggest a particular effect) and the role of the performer (to articulate a state of being within the formal aspects of the music) may be performed simultaneously by a single musician, or by many

[4] Levinson, Jerrold (1998). Emotion in response to art. In E. Craig (Ed.), Routledge Encyclopaedia of Philosophy. London: Routledge. Retrieved May 21, 2006, from http://www.rep.routledge.com/article/M018SECT4.
[5] Putman, Daniel A 'Music and the Metaphor of Touch', The Journal of Aesthetics and Art Criticism, Vol. 44, No. 1. (Autumn, 1985), pp. 59-66.

musicians, but the roles remain quite distinct. Putman says of the role of the composer in his article 'Music and the Metaphor of Touch':

> "From this perspective, a vital part of the creative process for the composer is the refinement of richer or more subtle emotional references….Creative composers have been able simultaneously to revise and sensitize their culture's way of experiencing the world in the same way that any creative individual who can 'touch' another person can revise and sensitise his or her way of experiencing life".[6]

Putman is suggesting that it is the work of the composer who has the power to intimately change the musical history and emotional understanding of the listener, but although the contribution of the composer can be invaluable presenting the possibilities of communication of a state to the performer, the composer's work is not in itself the essence of the music. Composers create a shell to carry the expressive communication suggesting an emotional state to convey, but it is not the essence of the music. A creation of a shell especially designed to be filled by a new expression of feeling with consideration of pitch, rhythm, articulation, dynamic etc. is built of physical elements which do not guarantee the successful communication of the expressive quality of the sound. Ultimately it is the performer who must deliver the message. The shell cannot communicate this that exists inside. Leotard defines this as *nuance*:

> "Now this opposition of matter and form, which corresponds to that of a measurable time and flexible duration, is called into question, or so I believe, by the consideration of timbre, or rather, of the nuance of a sound or set of sounds"[7].

Nuance is the player's expressive capacity, informed by his musical history of listening, playing, his bodily capabilities, the capabilities of the instrument, the states of being he has experienced and can bring to the performance.[8] It is unique to the player, and to the time of performance, and consequently the fusion of the player and the material of the composer are also unique, and can never be repeated. The space within a nuance is vast; we can inhabit the space, crawl inside the sound and hear every inflection. The composer's physical

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[6] Putman, Daniel A 'Music and the Metaphor of Touch', The Journal of Aesthetics and Art Criticism, Vol. 44, No. 1. (Autumn, 1985), pp. 59-66.

[7] [7] Lyotard, Jean-Francois,, 'God and the Puppet', The Inhuman: Reflections on Time, Cambridge: Polity Press, 1991.

[8] Neil Davidson, seminar March 2006.

design, can be reconstructed by another performer at a different time and in a different place, but the particular nuance of a performance, the strange combination of elements which combine to make a particular communication cannot be repeated[9]

It is impossible to truly remember the sound after the event, to replay it, and therefore any hope of the creation of a library of sound stored in memory, ready to be unearthed at a later date is sadly impossible. Recreation of the listening experience can be tempting. When we are moved in a new way and we recognise it, we may feel the need to revisit the experience consciously, or find the unconscious has transported us back to the particular listening memory in a bid to recapture the feeling. Being aware of our assumptions and our musical history, what we feel we know to be music and why, is important if we are to avoid allowing our emotional reactions to reinforce attitudes of expectation and disappointment which lead us to a fixed perception of what music happens to be. When we are moved in a new way that we do not understand, more so than if we do, we are drawn to recreate the experience in order to relive, to inhabit and rethink with the aim of unravelling an enigma. If we accept Putman's idea of refining, the …'revising and sensitizing…'[10] of the listener, even if by Leotard's idea of nuance and not singularly by the work of the composer, then attempting to remember, which is an attempt to possess, signifies that the experience was meaningful but it does not aid this process of refinement. It is more difficult because of it.

A memory of a piece which leaves a vague feeling of an emotion which is not recognised and named brings a great desire to search for like in other recognisable modes of expression. Putman states in his examination of analogies in 'Music and the Metaphor of Touch', language concepts and visual metaphors are unhelpful in making analogies with music and sound. In the article he examines theories based on the premise that sight is the crucial element used in understanding mental processes, and that language '..relies heavily on sight…'[11],

[9] Lyotard, Jean-Francois,, 'God and the Puppet', The Inhuman: Reflections on Time, Cambridge: Polity Press, 1991.
[10] Putman, Daniel A 'Music and the Metaphor of Touch', The Journal of Aesthetics and Art Criticism, Vol. 44, No. 1. (Autumn, 1985), pp. 59-66.
[11] Putman, Daniel A 'Music and the Metaphor of Touch', The Journal of Aesthetics and Art Criticism, Vol. 44, No. 1. (Autumn, 1985), pp. 59-66.

that we are most comfortable with visual information as it is '..less ambiguous than that of any other sense…'[12]. He argues that using visual metaphors and words are reflective of the experience of listening to music, and that by making these analogies we prevent ourselves from acknowledging the true experience of listening to music. He introduces the concept of using touch as the closest metaphor to sound for drawing analogies, arguing that there are many similarities:

> "The way that music refers to something in the same way that touch refers to something – immediate, non-conceptual, frequently imprecise, often emotionally powerful, definitely informative."[13]

He also draws parallels between the conscious and unconscious communicative qualities of both music and touch, stating that it is an 'invasive'[14] form of communication unlike words and visuals which are external. However, the concept of nuance is applicable to touch and music alike, and so they share the fact that it is impossible to truly remember either after the event; we are left only with an imprint of how we felt after the event. An analogy with touch not aid in the task of remembering sound. Language and visual metaphors share a problem in that although they may provide a reminder of the emotional experience of listening to the music to a greater or lesser extent after the event they are further removed from the invasive quality of music and touch (laying involuntary visual reactions aside) and do not help the listener to remember the nuance of the sound.

Nuance exists outside a definition of music, reaches the core of our being, and is simultaneously at the root of what we call music.[15] Nuance is expression in sound, a much broader and more direct concept than the particular construct of music. If expression in sound is music, this can lead the listener to appreciate extraordinary (or even ordinary) events in sound as music, and find new musical relations in all areas of listening. The most powerful aspect of both touch and

[12] Putman, Daniel A 'Music and the Metaphor of Touch', The Journal of Aesthetics and Art Criticism, Vol. 44, No. 1. (Autumn, 1985), pp. 59-66.
[13] Putman, Daniel A 'Music and the Metaphor of Touch', The Journal of Aesthetics and Art Criticism, Vol. 44, No. 1. (Autumn, 1985), pp. 59-66.

[14] Putman, Daniel A 'Music and the Metaphor of Touch', The Journal of Aesthetics and Art Criticism, Vol. 44, No. 1. (Autumn, 1985), pp. 59-66.
[15] Lyotard, Jean-Francois,, 'God and the Puppet', The Inhuman: Reflections on Time, Cambridge: Polity Press, 1991.

music is nuance, and the most powerful aspect of nuance, according to Leotard, is the 'power of a loss'[16]:

> "I mean that if this matter [nuance], so tenuous that it is as though immaterial, is not repeatable, this is because by being subjected to its seizure by that matter, the mind is deprived, stripped of its faculty – both aesthetic and intelligent – to bind it, associate it, I'd like to say to narrativize it, and therefore in one way or another (metaphysical or ontological) to repeat it."[17]

Understanding the power of the loss is not only to accept the passing of time, the inability to repeat a sound physically or in memory, that it passes and cannot be recalled regardless of whether we fully understand the communication which has passed, or the effect it has had on us, the listener. The power of a loss provides the urgency that compels us to listen with commitment.

It is also understanding that this acceptance of the loss acts as the catalyst in a new creative process. To adopt Putman's view of the role of the composer, what is created in the listener is a new level of understanding and subtlety which has an impact on our attitude to life. In reliving and trying to understand our experiences a new level of emotional understanding is created, we may recognise deeper emotion in ourselves and our relations with others, we may be lead to search for a greater understanding of the human condition.

To try and relive the recreated experience in memory is to try to repeat it, and this hinders the process of creation within the listener. Once the listener accepts the loss of the sentiment, creating a vacuum, this can lead to a searching for experiences of the same colour and intensity of feeling, or to a discovering of these aspects of emotion in familiar situations. It may lead to new listening experiences. In this sense, it is not what the listener creates, neither the construction of an idea of music, a memory of it, a web of analogies in a bid to understand or possess it which is of greatest importance. It is what the pure expression in sound creates when it finds a receptive ear; the acceptance of the

[16]Lyotard, Jean-Francois,, 'God and the Puppet', The Inhuman: Reflections on Time, Cambridge: Polity Press, 1991.
[17] Lyotard, Jean-Francois,, 'God and the Puppet', The Inhuman: Reflections on Time, Cambridge: Polity Press, 1991.

loss, the acceptance of a change and a continuation through life with a greater understanding of human experience.

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How does Varèse create a perceived spatial dimension in Ionisation through timbral organisation?

> "When new instruments will allow me to write music as I conceive it, taking the place of linear counterpoint, the movement of sound-masses, of shifting planes will be clearly perceived. When these sound-masses collide the phenomena of penetration or repulsion will seem to occur. Certain transmutations taking place on certain planes will seem to be projected onto other planes, moving at different speeds and different angles. There will no longer be the old conception of melody or interplay of melodies. The entire work will flow as a river flows…..In moving masses you would be conscious of their transmutations when they pass over different layers, when they penetrate certain opacities, or are diluted in certain rarefactions."

From a lecture given by Varèse at Mary Austin House in Santa Fe, 1936.

Spatial aspects of music have been defined in numerous ways with regard to instrumental and electroacoustic music in musical literature. The relationship of musical material to a 3-dimensional spatialisation of the instruments or speakers is one area of investigation.[1] Space has also been used as a metaphor to aid discussion of different aspects of music in relation to one another; such as using the term 'musical space' to describe a single entity amassed from individual spaces of timbre, dynamics, duration and pitch[2]; or 'musical space' as a vast horizon of music of all possible styles and genres, with spaces defined by musical ideas and characteristics. In another application of the term, the experience of the listener who hears a sudden juxtaposition of unexpected events in a work has been described as being of 'space', when he/she is freed from preconditioned musical expectations and the imagination is refreshed with a new perspective.[3]

It is clear that there are difficulties in trying to discuss ideas of space in relation to music; with many philosophical areas and approaches, each with their own set of assumptions and history of usage, there is no definitive language to describe the relationship of our understanding of space to our experience of music. Yet

[1] 'Spatiality of sound and stream segregation in Twentieth Century Instrumental music', Organised Sound, 3 (2), pp. 148, CUP, 1999.'
[2] Worrall, David, 'Space in sound: Sound of space', Organised Sound 3(2), pp.93, CUP, 1998.
[3] Gary S. Kendal, 'Juxtaposition and non-motion: Varèse bridges early modernism to electroacoustic music', Organised Sound 11(2), pp. 160, CUP, 2006.

many composers have been driven to manipulate and imitate our spatial awareness, and address the questions of sound in space.

Ideas involving space and music seem to have occupied Varèse's thoughts with regard to composition. His artistic vision of music moving in space seems to arise from an auditory and visual experience of space in the wider world, and has much in common with ideas expressed by David Worrall in his paper 'Space in sound: sound of space'.[4] Based on James Gibson's 'Ground Theory' of visual perception, Worrall has suggested how these principles might be extended to illuminate aspects of our listening practice, thus connecting our wider experience of space to our aural experience of art music.

Taking a 'naturalistic' or 'phenomenological' approach to the subject[5], Gibson's 'Ground Theory' uses 'evidence of responses to whatever stimuli occur naturally within the environment;' it is an ecological approach that focuses on the process of adapting between organism and the environment'[6]. Gibson states that our visual understanding of the 'ground' is that of a texture gradient, and that this texture stretches into the distance. We see more detail at close range and less at a distance, which results in an impression of depth. Worrall relates this idea of visual texture to how we perceive texture in music, with background ambiance and reverberance creating musical texture. With the listener experiencing sounds that are more indistinct or quieter as more distant, the impression of depth is created in much the same way[7]. These ideas highlight Varèse's underlying assumptions regarding how sound might move around an imagined artistic spatial realm.

Varèse completed 'Ionisation' for percussion ensemble in 1931, five years previous to his lecture given in Santa Fe. There is a strong suggestion that Varèse was articulation in words an exploration in music that is evident in the score of Ionisation. To venture that the ideas and images regarding the movement of sound in space were at the forefront of Varese's mind when writing Ionisation illuminates an aspect of the piece that is difficult to define, and yet remains

[4] Worrall, David, 'Space in sound: sound of space', Organised Sound 3(2): 93-99, CUP, 1998.
[5] Worrall, David, 'Space in sound: sound of space', Organised Sound 3(2): pp. 96, CUP, 1998.
[6] Worrall, David, 'Space in sound: sound of space', Organised Sound 3(2): pp. 96, CUP, 1998.
[7] Worrall, David, 'Space in sound: sound of space', Organised Sound 3(2): pp. 97, CUP, 1998.

central to the organisation of the work. In order for the listener to feel the kind of spatial experience implied by Varèse, with *'angles'*, *'overlaps'* and *'collisions'*[8], the work would need to be designed in 3-dimensional space, with instructions for the positioning of ensemble players in the performance space, in the sense that electroacoustic music is designed with speaker placement in mind. As it stands, Varèse has created a perceived spatial dimension that is imitative and evocative of aural perception of sound in 3-dimensional space, treating the idea of space as an aspect of music to be expressed rather than physically experienced. The spatial aspect of the work does present interesting questions regarding ensemble layout of the performers. However *'clearly perceived'*[9] the end result, considering that spatialisation may have been a factor in Varèse's organisation of the sonic material offers another lens through which to view this work.

Much has been written about Ionisation, and approaches to understanding the work have varied. Chou Wen-Chung's exploration "Ionisation: the function of timbre in its formal and temporal organisation", and Jean-Charles François' "Organisation of scattered timbral qualities: a look at Edgard Varèse's Ionisation" are among the most noted. Wen-Chung remarks in his introduction:

> "It is of course tempting to conform to Varèse's own terminology and employ such terms as "sound-mass", "penetration", "transmutation", and "rarefaction" in the analysis. However, as revealing as these terms might be in the study of his music, the adaptation of more conventional musical terms eliminates the necessity of defining Varèse's terms technically in the context of an analysis of the score. Moreover, if the conventional language is used, such terms as "chords", and "modulations" can be deliberately borrowed to highlight the replacement of pitch organisation in this score by that of timbre in conjunction with register."[10]

Wen-Chung's analysis does illuminate aspects of the work that clearly show Varèse's roots in the Western art music tradition, including a detailed introduction to the basic structure, identifying 3 groups of texture and how they interplay in terms of combining, overlapping and juxtaposing, the rhythmic

[8] Varèse, Edgard, Ed. Wen-Chung, Chou, 'The Liberation of sound', Perspectives of New Music, Vol.5; No.1 (Autumn/Winter 1966), pp.11.
[9] Varèse, Edgard, Ed. Wen-Chung, Chou, 'The Liberation of sound', Perspectives of New Music, Vol.5; No.1 (Autumn/Winter 1966), pp.11.

[10] Van Solkema, Sherman (Ed), Wen-Chung, Chou, 'Ionisation: the function of timbre in its formal and temporal organisation', 'The New Worlds of Edgard Varèse, A Simposium', pp.27, Institute for Studies of American Music, New York, 1979.

structure of the piece and other structural issues. Sections concerning the 'Functions of instruments and structure', 'Germinal rhythmic ideas and their functions', and 'Formal organisation', broaden the analysis, but the discussion concerning timbre does not extend to considering organisation by the imitative spatial dimensions of the work, nor the aspects of spectral characteristics such as density and opacity, pitch to noise weighting that are key to spatial arrangement, but are also of importance in this work in their own right.

Jean-Charles François has extended Wen-Chung's analysis to consider the spectral characteristics of the work in relation to rhythmic material and pitch area, and the triangular relationships between instruments who swap their material to create new spectral effects. In his introduction he states:

> "The present text should be viewed as complimentary to the analytical work by Chou Wen-Chung on "Ionisation". One hopes that it will add some useful contributions, specifically to the definition of the sound organisation of percussion instruments, with which I am extremely familiar."[11]

Adopting Wen-Chung's instrument groupings (aside from one or two exceptions) and general formal organisation of 3 distinctive texture groups, the pitch area of the instrument and the length of the decay. He also suggests that in many areas of the piece they have been selected because they produce particular pitch relationships between them, and that there is a relationship between the rhythmic material and the decay characteristics of the instruments. However, he stops short of attributing the organisation of the sound materials to an intention to create a spatial effect.

Denis Smalley's model of Spectromorphological analysis, created with the aim of forming a language that could be used in the perceptual analysis of electroacoustic works proves a valuable tool in understanding Varèse's approach to creating a perceived spatial dimension. On the subject of instrumental music, Smalley cites some examples of works for which a spectromorphological approach to analysis would be appropriate:

[11] François, Jean-Charles, 'Organisation of scattered timbral qualities: A look at Edgard Varèse's Ionisation', Perspectives of New Music, Vol. 29, No.1. (Winter 1991), pp. 49.

> "Some contemporary instrumental music can also be approached spectromorphologically – for example, the music of Xenakis, and younger composers like Grisey, Saariaho, Murial, Dillon and many others concerned with spectral and textural complexity…Even though this music is represented and achieved through musical writing, the score itself is a very inadequate representation of perceptual qualities. An aural approach which treats recordings of such works in the manner of an acousmatic tape work is often much more fruitful."[12]

Applying Smalley's model to Ionisation allows the primary concern to be the sonic material. It allows the consideration of implied spatial parameters in terms of vertical, horizontal and depth of field space, how sounds are grouped into shapes, how they move and grow and how much energy they are projected with. It considers density and opaqueness of spectral space, how sound is split into streams, how groups of material with spectral characteristics overlap. It also allows for the consideration for the *'Inferior resultants and of the differential and additional sound'* to be considered.[13] Through applying this model of analysis, the interplay of the shapes and intensities caused by the accumulation of decay and other factors can be considered an integral part of the work.

In order to discuss the multiple roles and characteristics of the material in relation to these issues, Wen-Chung's groupings of texture I, II and III will be referred to at various points throughout the analysis where appropriate.

The creation of a perceived frame of listening

In order for Varèse's *"Sound-masses", "Shifting planes",*[14] to take place two areas of definition are required; the creation of an outer frame to give the listener a sense of the space in which the sound is moving; and the definition of the movement and change of sound-mass or objects within this space. The perception of an area of space is defined by creating a sense of vertical, horizontal and depth of field dimensions.

[12]Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2(2): 109, CUP, 1997.
[13]Varèse, Edgard, Ed. Wen-Chung, Chou, 'The Liberation of sound, Perspectives of New Music, Vol. 5; No.1 (Autum/Winter 1966), pp.12.
[14] Varèse, Edgard, Ed. Wen-Chung, Chou, 'The Liberation of sound, Perspectives of New Music, Vol. 5; No.1 (Autum/Winter 1966), pp.12.

Vertical space

Smalley describes the spectral space as covering 'the distance between the lowest and highest audible sounds', in this work the verticality is defined by the general pitch range of the instruments Varèse has chosen. The percussion instruments are grouped into 3 rough areas of pitch, which make up the 3 main blocks of texture, although there is a gradation between them:

	(Triangle
	Slapstick)
Canopy =	Castanets
	Chinese blocks
	Sleigh bells
	Claves
	Tambourine
Centre =	Guiro
	Anvils
	Cymbals
	Tarole
	Snare
	Tenor Drum
	Military drum
	Suspended Cymbal
Root =	Large Chinese Cymbal
	Gong
	High Tam Tam
	Low Tam Tam
	String Drum
	Med Bass Drum
	Low Bass Drum
	Very Deep Bass Drum

This provides a vertical axis. The triangle does not fit into the three groupings of the instruments by nature of the fact that it is a long decaying instrument of high pitch; its function within the work is to highlight structural events.[15] The slapstick is also used independently to punctuate and accentuate events both of the basic instrument groupings of textures I, II and III are used in Wen-Chung's analysis (with some alterations to texture I), although they are defined more in relation to characteristics of the material rather than the pitch area of the instruments. In Spectromorphological terms, these three groups can be defined as 'canopy', 'centre' and 'root'. Smalley describes how spectral space is framed by 'canopies' and 'roots' that help contribute to the vertical frame:

> "Canopies and roots can be regarded as boundary markers which may have functions. For example, textures can be hung from canopies and used as goals or departure points."[16]

The root is established in the first four bars, with the sonorities of the lowest group of instruments. At 2 bars before rehearsal mark 1 the triangle enters, this is significant as it states the top of the vertical space in relation to the lowest instrument, the very deep bass drum which is also playing at this point. The military drum theme with other instruments at rehearsal mark 1 is a statement of the central area of the piece, with the continuing presence of the very deep bass drum keeping the sense of the root of the vertical texture. The highest group of instruments performs the role of a canopy texture, appearing at rehearsal mark 3. Later in the piece the canopy and root both provide 'goals' for upward and downward-moving trajectories.

It is clear that the instruments have been chosen for their decay characteristics in relation to their area of pitching; the secco nature of the canopy texture instruments when compared to the long decay of the low instruments only serve to highlight the vertical frame further.

[15] Van Solkema, Sherman (Ed.), Wen-Chung, Chou, 'Ionisation: the function of timbre in its formal and temporal organisation', 'The New Worlds of Edgard Varèse, A Symposium', pp. 30-31, Institute for Studies of American Music, New York, 1979.
[16] Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2 (2): pp.121, CUP, 1997.

Horizontal space

The perception of horizontal space differs in Ionisation from that of the vertical frame, as it does not stay fixed for the duration of the piece, instead changing from section to section. The sense of the horizontal within a section is defined by the pacing, in particular by the length of the decay of the instruments and also in terms of the feeling of emptiness or density of the material. Smalley states:

> "Occupancy of spectral space, the impression of space breadth, how it unfolds, where the high's and low's are located and how they are reached are directly related to the listener's interpretation of extrinsic factors as well as being strong formal determinants."[17]

The section at the beginning of the work and the other variants of texture I, at rehearsal marks 2, 3 bars before 6 and from 9 to the end, have the greatest feeling of breadth in the work. The long decaying qualities of the metal instruments give an impression of breadth, not only due to the delay between the attack and decay and the duration of the decay, but also in the way that the sound fills the spectral space. Where there is less density in the low instruments within a section there is a greater feeling of breadth; an increased density is caused by a faster rhythmic material and also creates a more potent energy increasing tension. The slow pace of the attacks, the nature of the decay of the instruments also plays a part in determining breadth; the low skins and metal instruments that decay in concentric circles rather than in one direction contribute to this perception of breadth. Consequently, texture I sections give a greater impression of breadth than the other texture groups.

Depth of Field

In considering the creation of a depth of field it is useful to consider Smalley's model in conjunction with David Worrall's ideas of spatial perception. Smalley states in his article:

[17]Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2 (2): pp.121, CUP, 1997.

> "Spectral density is related to distance perspective and needs to be considered along with space in general. This perspective aspect is represented by the distant-close continuum {in figure 7}. For example, a packed density of full spectral range, set in close foreground focus, will prevent other spectromorphologies form getting through because it creates a solid wall very close to the listener. The same density set further back will free space closer to the listener so that it can be occupied by other spectromorphologies."[18]

Of the instruments used in Ionisation, it is the root instruments, in particular those with the longest decay such as the tam tams and Chinese gong that contribute most to the experience of a depth of field. Even when an instrument form the canopy or group of material is heard at a quiet dynamic, the dry decay characteristics and sharpness of attack ensure that the instrument does not sound distant to the listener. Again, there are a number of reasons as to why these instruments can be perceived to frame the space at the most extreme distance; one technique is the 'p' or 'pp' dynamic markings start to increase as the piece moves toward the climax at 13. The previously discussed impression of breadth that is created by the long decay and slow pacing of the rhythmic material may also suggest a horizon strengthening the overall depth of field of impression. As the dynamics are closely related with spectral density, with louder markings producing more spectral density, the quiet dynamics ensure that spectral space is heard stretching towards the back of the texture.

In relation to visual perspective, Worrall quotes Gibson form his 'Ground Theory' study (1984):

> (Visual)…."Information contained in the ground (usually horizontal) plane is texture gradient. The elements that make up a textured surface appear to be packed closer together as the surface stretches into the distance; there is more texture detail in the object is to the observer. This gradient results in an impression of depth, and the spacing of the gradient's elements provides information about the distance at any point on the gradient.[19]

He then continues, explaining that Gibson's ground is a rough equivalent to aural background ambience, and that texture is equal to reverberance which causes the sound to be more indistinct the further away from the listener it is. The root instruments, those that are providing a depth of field outer edge have a soft and indistinct attack due to the low dynamic markings in the majority of the work.

[18]Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2 (2): pp.121, CUP, 1997.
[19]Worrall, David, 'Space in sound: sound of space', Organised Sound 3(2): pp.96, CUP, 1998.

The decay from the preceding notes often covers the attack of the distance is intensified by the clarity a close range of the more secco instruments. Therefore, depth of field is also created by the overlapping of textures and the number of different streams of material, giving the impression that there is room within the listening frame to accommodate many layers of material from the front to back gradient space in between.

Dynamics are also used to denote depth of field space, with low level dynamics contributing to the indistinctness of difficult to place detail. This also applies to pitch weighting in relation to the note to noise balance. Those instruments creating the depth of field frame, have a more complex combination of harmonic and inharmonic frequencies, possibly the balance is characteristically placed inside the listening space. This contributes to the overall indistinctive quality of the material.

Movement of sound-mass and changing characteristics of sound objects

The material that defines the outer parameters of the listening space, when considered from another angle, has a dual function in filling or moving around within the spectral space. If the outer edges are perceived as a box, the same material can now be considered with regard to how the box is filled. In considering the spectral density of a section and how it is created, Smalley uses 4 categories: 'Emptiness' is described as 'whether the space is extensively covered and filled, or whether spectromorphologies occupy smaller areas, creating large gaps, giving an impression of emptiness and perhaps spectral isolation'.[20] 'Diffuseness' is described as 'whether sound is spread or dispersed through spectral space, or whether it is concentrated or fused in regions'.[21] 'Streams', refer to the 'layering of spectral space into narrow or broad streams separated by intervening spaces'.[22] 'Overlap' is described as 'how streams or

[20]Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2(2): pp. 121, CUP, 1997.
[21]Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2(2): pp. 121, CUP, 1997.
[220]Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2(2): pp. 121, CUP, 1997.

spectromorphologies encroach on each other's spectral space, or move around or across each other to another region'.[23]

One of the most striking spatial elements of this piece is that of the relationship between spectral density and opaqueness, or 'plentitude' to 'emptiness'. Each section of the piece has a different characteristic of emptiness, which in spatial terms gives the feeling of a clear impression of the depth of range framing aspect. The most strikingly empty section of Ionisation occurs at rehearsal mark 1, where the low spectral density and dramatic saturation of the preceding space clears for the presentation of the rhythmic figure on the military drum. Varèse uses a number of techniques at this point to create emptiness. The very deep bass drum is still present here (following on from the previous section) maintaining the vertical and also depth of field space, and the canopy area of the frame is marked by the maracas only (another instrument with a more secco quality such as the Chinese blocks, or claves would be too clearly heard, and would interfere with the military drum theme. The instruments used to accompany the military drum are few; and Wen-Chung highlights that the bongos and cymbals work together to imitate the spectral quality of the military drum,[24] reducing the effect of multiple 'Streams' defined by the timbre, decay and pitch area of the instruments. Each spectral area of canopy, centre and root are sparsely represented, giving the impression of there being space in between the sounds both vertically, (due to the space between them in terms of pitch), and also by depth of field due to the dry resonant nature of the instruments used. Throughout the piece there are other briefer moments of extreme spectral emptiness such as in the second bar before rehearsal mark 5 and one bar before rehearsal mark 6.

In relation to those opaque sections there are contrasting sections containing what appears to be a saturation of the entire space (instead of a localised area such as the root, centre or canopy) with the instrument's decay characteristics, particularly the root instruments, and the pitched instruments at the end of the piece. This is achieved by either increasing the rhythm and/or dynamics to

[23] Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2(2): pp. 121, CUP, 1997.
[24] Van Solkema, Sherman (Ed.), Wen-Chung, Chou, 'Ionisation: the function of timbre in its formal and temporal organisation', 'The New Worlds of Edgard Varese, A Symposium', pp. 39, Institute for Studies of American Music, New York, 1979.

create an accumulating decay, piling up to create density, or using increased number of instruments, particularly in the more secco canopy region, or employing a combination of the two. The very deep, low and medium bass drum, military drum, snare, castanet and tambourine roll with dynamic marking 'pp', to 'ff' ('fff' for tambourine) at the end of the first bar of rehearsal mark 12 illustrates how the rhythm and dynamics are used in an accumulating effect to create a feeling of spectral density in which the whole listening space is saturated. There are very many areas where either rhythm or dynamics are used to manipulate the spectral density; they are the most frequently used means of creating sound-mass. The increased number of canopy instruments when the sleigh bells, castanets and tambourine enter at rehearsal mark 3, plus a rhythmic material that ensures lots of rattle and further coverage of the canopy area also gives an impression of increased spectral density. In relation to texture II at rehearsal mark 1 an increase in spectral density by the addition of instruments can be heard at rehearsal mark 3. Using sleigh bells, castanets and tambourine with a rhythmic material that ensures lots of rattle gives a much fuller coverage of spectral area, compared to the single beats played by unison maracas at rehearsal mark 1. The final section at rehearsal mark 13 of the piece is a dramatic saturation of space in a widened frame, when the pitched instruments are combined with the indefinite pitched instruments such as the particularly striking grand tam tam.

'Streams' are clearly audible in Ionisation through their definition of distinct timbre, decay and pitch characteristics. Streams can give the impression of moving closer or further away, from left to right, or can move vertically up and down through instruments of the same timbral family. One example which shows movement from near to far in one stream, far to near in another and a vertical movement upwards in both occurs before rehearsal mark 6. While there is much movement regarding the canopy of texture and other instruments in the preceding rehearsal mark, there is a stream that unfolds from a low, quiet beginning in the low tam tam, rising up through the other metals to the high tam tam and finally to the suspended cymbal. The other instruments reduce to a second stream of canopy instruments, finally tailing off with the Chinese blocks at the same time as the suspended cymbal. Each stream is defined by its timbre, the opposing decay characteristics (the dry woodblocks and the suspended

cymbal), by pacing, because the metal instruments give the impression of moving at a slower speed due to the longer period of time it takes for the decay to unfold, and the spectral area the stream is travelling from. The combined effect is that there is space in between the instrumental lines. Another of far to near movement with increased spectral coverage occurs in the section between rehearsal marks 7 and 8. The military drum and tarole are defined by their relative pitch position to one another, their decay characteristics and their dynamic marking. When the tarole first enters the spatial impression is that it is further forward than the military drum. However, the military drum crescendo gives the impression of moving forward, and as the dynamic increases to 'fff' the decay characteristic of the instrument becomes extremely audible, eclipsing the sound of the tarole and heightening the impression of forward movement.

Smalley's definition of diffuseness as 'whether sound is spread or dispersed throughout spectral space, or whether it is concentrated or fused in regions,'[25] could be understood as meaning how sound (encompassing all sounds) is spread or dispersed. Sounds from percussion instruments are more fixed in this respect than electronically generated sound in electroacoustic music. The sounds from the percussion instruments cannot modulate pitch area, nor appear in different parts of the frame, at a different dynamic marking, etc. at the same time. To understand the term as how sound (all sounds possible in this piece) appear within the frame is discussed in more detail through the other sub-headings such as density, sparsity, overlap, streams, movement and growth, as they are inextricably bound with issues of pitch, area, dynamics and timbral qualities.

The aspect of overlap and crossover; of 'how streams or spectromorphologies encroach on each other's spectral space, or move around or across each other to another region,[26] occurs in Ionisation when instruments of the same pitch area grouping, (from the canopy, centre or root groups) are split into individual streams whose spectral densities overwhelm whose of other instruments, and also where the density or dynamic volume of a sound or stream has overwhelmed other sounds filling the spectral space. Occasionally spectromorphologies subside

[25]Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2(2): pp. 121, CUP, 1997.
[26]Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2(2): pp. 121, CUP, 1997.

to reveal an underlying texture. The example of the tarole and the military drum (between rehearsal marks 7 and 8) first mentioned in regard to streaming is also an example of overlapping, where the military drum appears to overlap the tarole at the point before rehearsal mark 8. From rehearsal mark 9 to the end of the work this si a prominent feature, where streams of instruments seem to appear from and disappear into the wider texture. At the very end of the work as the other instruments recede the texture of the beginning can be heard in the final bar.

Motion and growth

Motion and growth is another area of Smalley's spectromorphological model that cannot be directly applied to Ionisation in its entirety in the way that it may be applied to electroacoustic music. This is due to the fact that once a sound is in motion there are limitations as to how it can be manipulated (as discussed with regard to diffusion). Motion concerns how much energy is contained in a spectromorphology, the force (speed) at which it moves, how rooted or otherwise it may be, what internal movement it may have. In Ionisation the motion of spectromorphologies within the spatial frame is caused by a number of factors; the speed of the change in dynamic from quiet to loud; the speed at which spectral density is created; the increase in pace of the rhythmic material. One category of motion Smalley defines is particularly relevant to this work:

> 'Motion-launching. The launching of motion varies. Some may be considered as self-contained events with gesture-based, pressured onsets (drag, throw, fling) while others could be thought of as emerging as if they had always existed (flow, float, drift)'.[27]

The first type of motion can be seen in the bar preceding rehearsal mark 1, where the very deep bass drum and other instruments have a roll beginning at the dynamic marking 'pp' with a crescendo 'ff', resulting in a saturation of spectral space. The crescendo and roll happen over a short period of time, but impression of speed at which the force moves from far to near and then fills the space is dramatic. The accumulation of decay in the low instruments is also used to create a launching motion vertically at rehearsal mark 8. The decay from the

[27]Smalley, Denis, 'Spectromorphology: explaining sound shapes', Organised Sound, 2 (2): pp. 115, CUP, 1997.

three consecutive beats on the bass drums gathers, and at its most intense point Varèse introduces centre and canopy instruments leading upwards to the final few beats played by the canopy instruments. The impression is of the swell of the low instruments creating a wave of energy that moves upwards, fizzling out at the top before the whole cycle is repeated again. Again, with regard to spectromorphologies emerging without a gesture at the onset this is not applicable to any of the instruments used in Ionisation.

The growth and change of individual spectromorphologies (in the sense that streams or single events may do) or of spectromorphological ideas which may need the addition or subtraction of other instruments in order to grow can be found in every section of Ionisation. Their ways of evolving have been explored in the above analysis.

Summary

Ionisation is a fascinating, multi-dimensional work that invites many approaches to analysis in a bid to understand its beauty. When examined according to Smalley's model of Spectromorphology and in relation to Worral's application of Gibson's 'Ground Theory' to listening it is possible to find evidence that Varèse did intend to create a spatial dimension in the work, through the design of an outer frame that enables a listening space to be perceived that is then filled with streams and spectromorphological ideas that move around the space in various ways and with various levels of energy. There is evidence to suggest that the perceived movement of streams and spectromorphological ideas is caused by increasing the spectral density through the interplay of dynamics and rhythm, and adding and taking away instruments in the canopy, centre and root areas of the spectra. However, Varèse's spatial dimension in Ionisation is one that in reality remains in an expressive domain rather than as a physical 3-dimensional experience, an intension alluded to in his lectures that may have only come to fruition in the creation of 'Poeme Electronique'.

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Analysis of themes and methodology used in *Hothouses Bloom* and *String Quartet*

Introduction

This folio of works and written research represents a progressive journey of thought and insight gained through the experiences of rejecting, clarifying and affirming ideas relating to music and the process of composing. In order to give context to the works the main areas of interest that emerged throughout the course of writing these pieces are outlined in this paper:

I. The implications of writing for the two different ensembles.
I.I. The influence of ideas regarding the sound of energy-flow and relationships between gesture, texture and melody.
I.I.I. The questions posed with regard to methodology in using aleatoric processes.

I. The implications of writing for two different ensembles

Hothouses Bloom, history and ensemble identity:

'Hothouses Bloom' for soprano, celesta, harp and harmonium was written as a result of a call for chamber works to be performed alongside Schoenberg's 'Hertzgewäsche' (Op. 20). As a consequence of programming new works alongside Hertzgewäsche the composers' dialogue with another era was of central importance to the concert. Questions concerning the identity of the ensemble, the approach to writing it inspired and how contemporary attitudes viewed the passage of time and history were of primary focus in both this work and the works of the other composers who took part.

The enthusiasm during the early part of the century for exploring interesting and previously unused combinations of instruments in chamber music was part of a general resurgence in composing for chamber ensembles, due in part to the rejection of the large-scale orchestras and *'emotional excesses of late Romanticism'*[1], but also due to the economic benefits of using less players to

[1]Bashford, C. '*Aleatory',* Grove Music Online, Oxford Music Online, 8 April 2008,

stage concerts.[2] Using unusual combinations of instruments became an expression of individuality[3], but could also be viewed as a response or rejection to the potentially problematic weight of identity, tradition and history that must be considered when writing for ensembles such as the orchestra or string quartet. Initially I experienced a feeling of freshness and playfulness in exploring the possibilities of this ensemble, feeling free of responsibilities of the questions posed by the programming and trying to emulate an imagined sense of free possibilities that may have characterised the period from which this ensemble emerged.

It quickly became clear that this approach was problematic and was no basis from which to create an adequate response to the task. A vast repertoire of chamber music has been developed during the intervening years between the completion of Schoenberg's 'Hertzgewäsche' and the present day, during which time music has evolved considerably; at the time of writing Hothouses Bloom my work had been informed by this repertoire in a number of particular ways. Firstly, the broadening of the timbral palette of the instruments of the ensemble, particularly by the exploration of extended techniques by composers such as Berio in the 1960's afforded greater possibilities in writing for the ensemble in the present day. At this stage I was yet to become aware of the work of composers in relation to spectra and timbre that has taken place between 1960s and the present day, but was interested in the combinations of timbral properties of the instruments. Secondly, the profound influence of technology on chamber (and other) music since the mid twentieth-century, in the realms of perception, aesthetics and not least in the physical opportunities it created for the manipulation of sound and space in performance and recording. At the time of writing this work I was considering questions of sound and space, and of gesture and rhythm, experimenting with recording environmental sounds and attempting analysis of the sonic behaviour of bouncing marbles. Finally, new techniques and philosophies were developed during the twentieth century posing questions in music for all genres, such as aleatoric compositional practices that were employed in the making of this work.

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http://www.oxfordmusiconline.com/subscriber/article/grove/music/05379.
[2]Ibid.
[3]ibid.

While acknowledging that it was not possible to maintain an approach aiming to be free of responsibility to the passage of time, the question of how to proceed remained. One response to this question was to use aleatoric techniques in a bid to minimise the historical inferences of some aspects of language of the work itself such as harmony and structure. By subjecting rhythmic gestures, chords (derived from a bank of sketches designed previously to form the basis of a musical language for the works in this folio) and timbral colours as 'sound-objects' to chance procedures to gather at random into larger gestures and textures, I hoped to make a sequence of unexpected events which although related to the mid twentieth century by virtue of the extended techniques used and the use of aleatoic techniques were not related definitively to any period with regard to harmonic language or structure. However, this became increasingly difficult to execute due to conflict caused by dissatisfaction at the material created during this process (see methodology) and resulted in a mixture of chance relationships and tonal harmony and structure. The suggestion that the ensemble will suspend their identity as soloists in order to create a work based on group texture is implied in the opening section (bars 1-18), but as the piece progresses the beginnings of a dialogue emerges between the flow of gestural sequences and the solo melodic writing (an example of this can be seen in bars 31- 33, where after a flowing sequence beginning in bar 27 the harp performs an accelerating descending sweep which is reciprocated immediately by the ascending vocal melodic line). While this dialogue appears in its infancy in this work it is explored in greater detail in String quartet.

<u>String Quartet, genre, history and ensemble identity</u>

> 'The string quartet is at once a medium and a genre, even a form. And a form or genre is not defined by a single work, any more than a species can be traced to a single parent. Rather it evolves, and once evolved it provides an image or an ideal for subsequent works. And though, naturally, the image of the string quartet has changed and developed during its history…the constant presence as executants of two violinists, a violist and a cellist, four persons to whom all quartets are in the first place addressed, has given the string quartet an identity unknown in any other repertoire.'[4]

'Paul Griffiths: 'The String Quartet'.

[4]Griffiths, Paul. '*The String Quartet',* Pitman Press, Bath, 1983.

The nature of the string quartet as outlined by Paul Griffiths above presents greater challenges to the composer's approach. Once again questions are asked of the composer regarding how the influence of repertoire and listening experiences have shaped our understanding of identity, history and tradition, and what bearing this has on the music we write. Whittal observes the problems of the consciousness of history of twentieth-century composers and the evolutionary approach to composition in the introduction to his paper '*Twentieth-Century Music in Retrospect: Fulfilment or Betrayal?*' He quotes Alexander Goehr:

> "Composers find their subject matter in the contemplation of other works of music from whatever point of view, because such works contain within them all the preoccupations of the past and greater composers, their hopes, their dreams, successes and failures as well as, presumably, the indefinable subject matter of music itself."[5]

In the paper Whittal discusses the fact that this approach has not been shared by composers across the centuries, but has influenced the sensibilities of the twentieth century composer in particular. Goehr illuminates how by engaging with the works of other composers we maintain an evolutionary approach; indeed an awareness of a historical significance of writing for string quartet is very much a part of the works which I have studied and influenced my writing. Ligeti's second string quartet, with its dialogue regarding the function of solos and their relationship to the textural material was particularly important in considering the emerging discourse in my work regarding the interconnection of the three elements of melody, texture and gesture. Lutoslawski's use of aleatory to thwart the traditional communication of the players with respect to rhythm, thus calling into question the identity of the quartet was also of significant importance in exploring the connection between the solo and group identity of the players.

As mentioned in the previous section there are a number of places in Hothouses Bloom where the interplay between soloistic writing and gesture have been tentatively explored, an issue returned to in writing String Quartet. In this work, rather than viewing aspects of gesture, texture and melody as separate, soloistic

[5]Whittal, A. '*Twentieth Century Music in Retrospect: Fulfilment or Betrayal?*', The Musical Times, Vol. 140, No. 1869 (Winter 1999), pp.11.

writing is used as a vehicle to examine how these aspects can be present in a single musical idea or line, and how the 'weighting' in favour of (i.e. the quantity of) one or other of these characteristics within the music is perceived by the listener (also see section (b), 'Gesture and texture as forming principles'). Examples of this can be found throughout the work. The second section of the first movement features a violin line that begins with held notes and the primary function of creating vertical awareness of the range, allowing the main focus to remain with the textured material of the violin 2 and viola/cello pizzicato lines. The weighting of the line from texture to melody increases through the section as the melody becomes unpredictable and intense. In the second movement the weighting between texture and melody is explored in the same phrase at bars 6 and 106 respectively. The emphasis on the textural disturbance of the melodic line caused by the trills is created by an appearance of trills in the underlying texture played by the other instruments. When this same phrase is repeated at bar 106 as a solo line without the context of the lower texture the melodic aspect of the line appears more dominant. In the cello solo (bar 108-118) material which has been used in sections 1 and 2 as a textural line now appears as a solo. In this context the weighting is in favour of the melodic interest of the material although it still retains its original textural character. In the final movement the melodic section between bars 25 – 37 is significant as the texture serves as an accompaniment to the violin 1 as soloist, rather than the material of the solo drawing attention to the texture (like the violin solo and texture present from bar 6 of the second movement); here the melodic qualities of the line are the main focus for the listener. The entry of the viola and cello distract from the rhythmic clarity of the violin line and merge once again into accompanying texture.

<u>Ensemble identity and the essence of communication in string quartet playing:</u>

In aiming to create a moving organism of sound in which rhythms of localised gestures collided or overlapped (bars 1–35), it became clear that the relations of the instruments of the quartet and how they functioned with regard to rhythmic communication were being called into question. Therefore, the first movement explores fine balances between the stability inherent in the hierarchic rhythmic values dictated by using a conservative range of notated language, and how

subtle disturbances in the veneer of a texture can be achieved through tiny elements of chance and players working independently from one another. In the opening material players are working independently and although there are relationships between the various parts that suggest a rhythmic coherence or gestural sequences it has been important for the most part to obtain an effect of a general flow of material with events that imply a movement together rather than a simultaneous execution of events in different parts. During the second section (bars 33-50) the indeterminate quality of the grace note is exploited in its placing before rests in the viola and cello pizzicato material, and in the interplay between the grace notes and the fixed rhythmic elements. Here the players are also working independently, and it is this combination of factors that results in slightly stilted and uneasy effect. In the fourth and final col legno battuto ricochet section (bar 74- end), again players are instructed to play independently to create an element of stillness within the texture. This is in opposition to the use of the same material in the second movement where the emphasis is on close communication to emphasis the rhythmic relationships of the attacks to one another to create a forward trajectory.

In contrast to the first movement, a central idea of the second movement is the dependency of the material on accurate intimate playing for effective communication of the music. This can be seen in all of the material, ranging in style from the col legno battuto ricochet section (see (b) 'Gesture and texture ads forming principles) to the chords that begin in bar 24 and reappear throughout the movement. The unsettled nature of the second movement is reflected in the fragmentary nature of the material itself rather than in the way the players relate to one another.

Movement 3 sees a return to exploring the effect of rhythmic independence in order to create a more intense and unpredictable character in the opening pizzicato section (later played arco). Here Lutoslawski's string quartet offered solutions in his use of fluctuating tempi in the second movement; by using this idea in my work I was able to create a material which has an effect of aggressive, free-wheeling motion.

I.I. The influence of ideas regarding the sound of energy-flow and relationships between gesture, texture and melody

My interest in how sound relates to energy-flow begin with trying to understand how pressure and release in the body affected how sound was produced in stringed instruments; how the relationship of the body affected the way the bow bounces, how concentrated tension could produce a release with a scattering sound, indicating a dissipating energy. This lead to an interest in how the sound of other objects behaved with various human interventions, and ultimately to wonder how these characteristics of sound might relate to notated music. A set of experiments followed involving recording the behaviour of marbles and concluded with an attempt to try and find ways to notate the rhythm generated by the action. This was abandoned due to the unsuitability of the activity (see methodology section). However, my sketches began to (unconsciously) imitate the characteristics of this impact and energy, reflecting a search for ways to construct gestures based on notated rhythmic values. This can be seen in Hothouses Bloom throughout the work and in the example cited above discussing the dialogue between gestural flow and melody writing (bars 31-33). Ultimately it was in using Smalley's model of Spectromorphology to analyse Varèse's work 'Ionisation' that I achieved a greater clarity of understanding regarding this matter.

Playing with surfacing ideas concerning the decay characteristics of the instruments used in Hothouses Bloom and listeners' perception of space lead to another set of questions which would ultimately be clarified by Smalley's model of Spectromorphology. The opening section of the work is shaped by the idea that sparing events and the long, low decay of the harp play on our environmental experience by imitating the feeling of standing in an empty room. In researching the question 'How does Varèse create a perceived spatial dimension in Ionisation through timbral organisation', by using Smalley's model to analyse the work, and after further investigation into the works of Xenakis, it became clear that in order to ensure the listener's experience of the relationship between sound and space the composer must either re-arrange the

layout of the performers and audience to create an effect, or to work with electronics and speaker placement to present a truly three-dimensional relationship between the two concepts.

Denis Smalley's model of 'Spectromorphology in relation to String quartet'

Smalley's model was designed primarily to aid listening and enrich the analysis of electroacoustic music. He considers our approach to listening to electroacoustic music, examining the preconceptions and differences in our wider, worldly experience of listening, and also the listening to electroacousic music in the context of our experience and history of listening to instrumental and vocal music. He examines aspects such as *'gesture and texture', 'motion and growth', 'behaviour'*, and the movement of *'sound shapes'* around a perceived space, *'spectra', 'spectral space and density', 'space and spatiomorphology'*.

Although initially created with the aim of using in relation to electroacousic works, he does cite examples of instrumental works that could be appropriately analysed using a spectromorphological approach:

> "Some contemporary instrumental music can also be approached spectromorphologically – for example, the music of Xenakis, and younger composers like Grisey, Saariaho, Murial, Dillon and many others concerned with spectral and textural complexity. In this music there is often a loss of instrumental identity as the orchestra is 'resynthesised' into a kind of spectromorphological hyper-instrument. While we may sometimes be conscious of instrumental identity we can equally be persuaded to forget individual note gestures as these individuals are subsumed into streams and collective motions. Even though this music is represented and achieved through musical writing, the score itself is a very inadequate representation of recordings of such works in the manner of an acousmatic tape work is often much more fruitful."[6]

There are a number of reasons why String Quartet no.1 should not be considered a work suitable to undergo this kind of analysis exclusively; it is not a spectral composition and therefore the spectral qualities of the instruments and the various techniques and timbres have not been 'resynthesised'[7], there is no

[6]Smalley, D. *'Spectromorphology: explaining sound-shapes'*, Organised Sound 2(2): pp.109, Cambridge University Press, 1997.
[7]Ibid.

electronic element of the work to merit spectral or physical spatial analysis, and no spatial arrangement of the players in performance. It is necessary to apply in tandem a model of analysis more suited to the other aspects of the work including harmony, rhythmic structure and traditional phrasing in the melodic passages. However, Smalley's model can shed light on the particular behaviours of sound energy in motion; by understanding more clearly what is heard as the energetic qualities of music and sound change, it has been possible to make a better attempt at re-creating this according to the craft of notated form, and within the boundaries of notation I have chosen to adhere to.

Gesture and Texture as Forming Principles

Smalley's definitions of gesture and texture are of opposing forces concerning forward motion, or *'the energy of motion expressed through spectral and morphological change'*[8] as opposed to material suggesting stasis, where gestures are *'too stretched in time, or too slowly evolving'*[9] resulting in *'..loos[ing] the human physicality.'*[10] To summarise he states:

> 'Gestural music, then, is governed by a sense of forward motion, of linearity, of narrativity….A music which is primarily textural, then, concentrates on internal activity at the expense of forward impetus.'[11]

However he continues:

> 'But most musics are texture-gesture mixtures, either in that focus shifts between them, or because they exist in some kind of collaborative equilibrium. Where one or the other dominates in a work or part of a work, we can refer to the context as gesture-carried or texture-carried'.[12]

The interplay and complexity of the gestural/textural relationships and their balance-weighting with regard to a third dimension of melodic intent is an important theme throughout this work. An example of this can be found in the material of the first movement (bar 1–32). The relaxed but unmistakably forward-moving motion highlighted by the outline of an oscillating shape can

[8]Smalley, D., pp.113-114.
[9]ibid.
[10]ibid.
[11]ibid.
[12]ibid.

comfortably be described being 'gesture-carried' with a 'texture-filled interior'[13], which is disturbed at various points by a catalystic rising and falling figure in the violin 1 and cello parts. It is clear that there are also many instances of gestural interplay within the texture, and even events from within the texture which have an effect on the behaviour of the gestural outline. E.g. in bar 3, beat 2 of the viola part the grace notes/ quaver at the beginning of the beat gives a quickening of rhythm which acts as a catalyst for the cello septuplet to move more quickly than previously through this low dip in the oscillation, leaving a short break before moving back up to the mid-point of the texture.

Here, and in many other areas of the texture melody is used to highlight the change in energy or pace of forward trajectory or to highlight individual gestural movement within the texture but without a structural significance. The balance between texture and melody is designed to be fine and any suggestion that a stronger melodic passage may emerge is quickly dissipated by the dissolution of melody into the overall textural, or by gestural qualities moving to the fore.

Another example of the fine balance between the gesture and textural relationship is the final section of the first movement, comprised of the col legno battuto ricochet combination. Within the context of the first movement this material is 'texture-carried', where the players are instructed to play their individual lines without regard for the other parts, but treating each ricochet as an individual gesture, with the result that the ear is drawn into the sounds of the texture with the emphasis on the detail and the global effect of the texture. In contrast, when the material reappears in the second movement is gesture-carried. The main concern is the forward-trajectory of the energy movement caused by the relationship of the rhythm of the attacks of the ricochet, where the players working together and are instructed to press forward, anticipating the entry of the next player, as if in a game of chase.

Spectral space and density

As in *Ionisation* and in all instrumental writing that does not also include the use of electronics and design for performance as 3-dimensional work, any inclusion

[13]Smalley, pg.114.

of the design of a spatial dimension cannot in reality be perceived, only suggested. The ideas of spatial arrangement or movement through space in this string quartet only apply a movement through a vertical spectrum, and general awareness of a solidness or opacity of sound and how the work moves from one spectral area to another. Due to the fixed nature of the properties of the sounds involved, it is the focus that moves from one area to another, rather than the sounds moving from one to another in a vertical spectrum. E.g. there is no lower pitch-area of col legno, the notes of high chords can be transposed but the timbral qualities change as the register changes. Smalley uses a loose framework to discuss the vertical axis starting at a 'root' area, and ascending through the 'centre' up into the 'canopy'. It is useful to consider the range of the quartet from this perspective as it allows the inclusion of sounds with a pitch-weighting (rather than an absolute pitch) to be included such as the col legno, which would appear at the top, in opposition to notes in the C-string range of the 'cello which act as the 'root'.

Smalley continues describing the various ways of how sound moves around and fills spectral space in terms of *'streams and interstices', 'emptiness and plentitude', 'diffuseness and concentration' and 'spectral density and opacity'*. It is worth noting that while the application of the concept of 'diffuseness and concentration' and to some extent 'spectral density and opacity' are useful in understanding the scattered rhythmic textures and opposing unison chordal material that appear in the work, applying the other concepts will serve no advantage over a traditional analysis of texture appearing in areas of vertical range. Smalley's *'note to noise'* spectrum is also useful in considering the density and opacity of techniques such as col legno battuto or col legno tratto as opposed to absolutely pitched material. However, the final section entitled 'space and spatiomorphology' is designed for works with a 3-dimensional sound design, and is not suitable for application to this string quartet.

I.I.I. Methodology

The techniques I have employed in the making of these works have varied with regard to their ideological aims and have influenced my understanding of the role of the composer as a result. In using techniques based in both an aleatoric

philosophy and in a traditional deterministic approach to writing, my approach has fluctuated between these ideologies and at times this has caused conflict. My experience of working through this course of research and in reflecting on the finished folio it is clear to see the direction that future works and research can take in broadening the themes and questions raised through the course of this research; to explore further the relationship between aleatoric techniques in the process of creating notated works, to research the spectral properties of instruments and the methods of the spectral composers in applying this knowledge, to explore repertoire and considerations of using recorded or non-instrumental sounds in relation to instrumental sounds.

Definitions of aleatoric aesthetic and traditional Western aesthetic:

One paper which has aided my understanding of the implications of using both aleatoric and other processes in writing these works is Hoogerwerf's *'Cage contra Stravinsky, or Delineating the Aleatory Aesthetic'*[14] Published in 1976 this paper discusses a tendency of the time to view the aleatoric approach (based on Cage's work and writing) as polar to a traditional understanding of the role of the composer (based on Stravinsky's work and writing). Although particular to its time it has aided my understanding of the historical basis of the argument and of the common aspects of both approaches.

Hoogerwerf describes the traditional aesthetic as exemplified by Stravinsky's approach as viewing works of art as a construct of the conscious mind;

> 'The traditional aesthetic has always viewed the compositional process as one of individual, subjective control – the human mind consciously selecting sound materials and organising them into a coherent whole. Secondly, as if to demonstrate this control, the traditional composer makes use of a syntax – all sounds are ultimately related to each other; the work of art can be perceived as a rational construct through analysis of this syntax. The third concept has to do with the resultant product – a sound-piece which may be said to possess aesthetic distance, a work set apart, distinct from sounds encountered in everyday life simply because the sound materials have been manipulated, systemised, and refined by the sensitive imagination of the composer.'[15]

[14]Hoogerwerf, Frank W. *'Cage Contra Stravinsky, or Delineating the Aleatory Aesthetic',* International Review of the Aesthetics and Sociology of Music, Vol. 17, No.2, (Dec 1976), pp.235-247.
[15]Hoogerwerf, Frank W., pp.241-242.

Definitions of aleatoric composing include the use of aleatoric processes in the creation of fixed notated works, the inclusion of techniques to create indeterminate aspects of works in performance, such as variable duration, and elements of decision-making by performers in which they affect the outcome of a work, such as making structural decisions.[16] Hoogerwerf defines Cage's view of aleatoric aesthetics in relation to the traditional approach:

> "For the aleatoric does not propose esoteric new methodology or stylistic change, but rather a new philosophy of art which questions, challenges or voids traditional aesthetic fundamentals…the aleatory. Cage-ian aesthetic evolves in direct contrast to the above. Firstly, aleatory aesthetics no longer views the composer's role as one of individual selection, but rather an acceptance of sounds as they are; consequently absolute control of the material may be relinquished. Secondly, aleatory aesthetics has no use for a system of sound progression (syntax), since it has no need of demonstrating composer control; any sound may now succeed any other. And lastly, since auditory materials have no direct intended relationships, aleatory music is not distinct from, but rather an affirmation of everyday life – both are ultimately uncontrollable and indeterminate'.

The attempt to polarise the two approaches is questionable, and in the concluding sections he does address the point that both approaches are not mutually exclusive; that Stravinsky would recognise the importance of an unexpected happening during the compositional process and take note, and that with 'chance' compositions such as Cage's '4 ' 33", it is the act of creating a frame (in this case durational) with which to view happenings as art that makes the piece: an act of will which creates the artwork. Yet he does clarify a number of underlying presumptions I had not acknowledged in beginning this process of composing for folio. The belief he states that the *'concept of music as personal, individual expression as essential to the traditional aesthetic'*[17], that the traditional role of the composer *'sees the human intellect consciously manipulating abstract sound materials, shaping them into a coherent whole, as the essence of compositional activity*[18] articulates a set of values that have underpinned my approach during the creation of this work, and that have remained regardless (or in spite) of the conflict that arose by employing aleatoric techniques during the process.

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[16]Griffiths, P. 'Aleatory', Grove Music Online, Oxford Music Online, 8 April 2008. http://www.oxfordmusiconline.com/subscriber/article/grove/music/00509.
[17]Hoogerwerf, Frank W. '*Cage Contra Stravinsky, or Delineating the Aleatory Aesthetic*', International Review of the Aesthetics and Sociology of Music, Vol. 17, No.2, (Dec 1976), pp.238.
[18]ibid.

In beginning this process with the aim of trying to create a musical language with a view to 'learning' it and then being able to execute it fluidly in relation to other ideas which may shape a piece, the tendency towards the Hoogerwerf's traditional aesthetic can be seen. These activities included creating chords for a harmonic language based on an entirely subjective relationship between harmony and colour, exploring various rhythmic combinations working with and against pulse, and considering the sound of energy transference and how this was created by musicians in the way they play, listening and comparing this to environmental sounds (e.g. recording marbles as they rolled or bounced along a surface, dropping many to create a scattering effect), and then trying to relate these 'chance' rhythms to rhythmic notation. During this stage a large body of sketches were created, each with the potential to be developed further and incorporated into a bigger work.

A change of direction and, according to Hoogerwerf's definitions, aesthetic values took place in the early stages of writing 'Hothouses Bloom' with the application of a process of creating 'sound-objects' out of the various timbral possibilities of the instruments, 'rhythmic objects' out of small units of rhythm (some from bank of sketches), and 'harmonic objects' from the bank of chords created in the general sketches, and then finding combinations of the three elements by pulling them out of a hat. Unfortunately, removing any rules of conscious relationship-building between the sounds resulted in a sequence of events with which I was dissatisfied and a nervousness of relinquishing control followed. The resulting piece is a mixture of melodic writing, tonal harmony and structure, and random sequences of events from this process.

A number of sketches from the initial body of material were also used as the basis for String Quartet; and a layered approach to developing the material emerged. By typically using similar aleatoric processes to that of Hothouses Bloom in order to vary and extend the initial material, this would be subject to a level of intuitive interference e.g. changing some aspect of rhythm or harmony. The material would then be subject once more to similar chance procedures, possibly with a different set of parameters, and then again to intuitive interference. By repeating this process as many times as necessary it was

possible to attain fine balances of texture, gesture and melody, and to create material that had not only a level of conscious relationship-making, but also a further layer of interest provided by the chance relationships in the detail of the material. Throughout the process the emphasis on the traditional approach of choosing what to retain and what to change remains dominant, and extends to structuring within sections and across the first and second movements; much of the shapes of the first and second movement which were influenced by ideas concerning flow of sound and spectromorphological sound-shapes were structured using the eye to discern proportion and shape of the flow. Unlike in Hothouses Bloom, the strong tonal harmonic characteristics of parts of this work are an intended part of the language of this music. Again, the preference for creating language and relationships can be seen.

The third movement contains development in a number of directions. In using a moment form framework of imposed number of beats and juxtaposing rather than contrasting ideas[19] there is a relinquishing of the control present in the oscillating narrative structuring of the second movement. The conscious decision to use this form stems from an appreciation of the effect of creating a *disjuncture*[20] of ideas and therefore a number of possible listener responses[21], and is ultimately still based on the traditional aesthetic approach of presenting a design or idea to the listener. In the third movement there is also a move to introduce an increased but controlled level of indeterminacy in the interplay of the rhythm and duration of the Tempo rubato sections containing fluctuating tempi. This movement sees a departure from the conflict with Cagean aesthetics that have caused tension in the preceding movements and only the chords have been treated as sound objects in the sense that their order has not been predetermined. However, there is only temporary resolution in the relationship between the two aesthetic ideas, and a broader need to continue to find ways to reduce the imposition of will to ensure that the inherent qualities of future writing is allowed to shine.

[19]Kendall,G. S.' *'Juxtaposition and Non-motion: Varese bridges early modernism to electroacoustic music',* Organised Sound, 11(2), pp.160, Cambridge University Press, 2006.
[20]Kendall. Pg 161.
[21]Kendall, pg. 161.

Self-expression, control and the '*infinitude of possibilities'*

In aiming to create a language of basic materials and sketches of ideas with which to create a recognisable identity in these works, a problem arose in moving from this stage of the process to developing the sketches into pieces. By creating a large number of sketches, each with a potentially vast number of ways to be developed, the choice of which to develop became restrictive; at one stage it felt impossible to move forward. Hoogerwerf discusses this point in relation to Stravinsky:

> 'With Stravinsky, the constructive play of human intellect with sound is not just a given prerequesite, but almost an obsessive absolute, without which looms an unfathomable chasm, a profound void. Constraint (selection) provides coherency and reassurace, and strengthens the process of composition:
>
> "I experience a sort of terror…before the infinitude of possibilities…if everything is permissible to me…will I have to lose myself in this abyss of freedom? To what shall I cling in order to escape the dizziness?"
>
> 'The answer is inescapable:
>
> "My freedom will be so much the greater and more meaningful the more narrowly I limit my field of action and the more I surround myself with obstacles. Whatever diminishes constraint diminishes strength. The more constraints one imposes, the more one frees one's self of the chains that shackle the spirit.[22]

The resolution to this problem arrived in restricting the basic idea for the first section of the first movement to a few lines of notated sketch. Following this, by designing a set of parameters where any idea that did not express the opaque nature of the texture was rejected (e.g. no sustained, layered writing or rhythmic density), and working within conservative bounds of notation I managed to proceed.

Hoogerwerf then concludes that Stravinsky's aim is self-expression, that it is the carrying out of the compositional activity that is fulfilling, and that the

[22]Hoogerwerf, Frank W. '*Cage Contra Stravinsky, or Delineating the Aleatory Aesthetic*', International Review of the Aesthetics and Sociology of Music, Vol. 17, No.2, (Dec 1976), pp.238-239.

properties of the materials themselves are of secondary importance.[23] He continues with this theme, citing Martinain:

> 'According to Martinain, art is a "work-making activity of the human mind, in which the self, aware of its own existence[24] (subjective consciousness), manipulates materials in the expression of its own ideas – "art as a virtue of the practical intellect"[25]. And Martinain rightly points out that such a view has been characteristic of Western art since the time of the Renaissance.'[26]

In relation to the experience of writing these pieces seeking self-expression in the form of ideas has caused particular difficulties; at times placing too much emphasis on applying ideas or strictures to the process has created conflict with allowing the inherent qualities of the material to shine. This raises the question of whether it is possible to be fully conscious of all the implications of your actions, and whether it is valid to make decisions based on intuition.

Intuitive decision-making is not uninformed decision-making, but in moving from the problem-solving domain of conscious thinking into the realm of the unconscious the composer accesses the full wealth of his/her history and knowledge of music accumulated over years of living and studying, and it is this experience which informs the decision-making process. This matter was addressed in relation to listening when researching the question "what is the creative role of the listener of music and why is it important' early in the course of this process:

> "We have been listening since the day of our birth, our understanding of music is formed by modest experiences at first; meaning in speech conveyed with pitch, dynamics, articulation and rhythm and later, simple songs sung by our family members and teachers, awareness of musical characteristics in the natural world, music in advertising, music on the radio and television, televised and live performances, and so on. We are born into a wealth of music and sound. A musical history is created by the absorption of these sounds. Fragments of musical experiences, of those used for communication, of tradition and environment are entwined with fragments of the experiences of the listening choices we have made. This complex form, which is at the core of our listening process, informs our belief in what music happens to be[27]."

[23]Hoogerwerf, Frank W., pp.239.
[24]ibid.
[25]Martinai, J. As cited by Hoogerwerf, '*Creative Intuition in Art and Poetry',* New York, 1953, Ch.2.
[26]Hoogerwerf, Frank W., pp.239.
[27]Docherty,C, *'What is the creative role of the listener of music and why is it important?'* (folio essay).

When we move to an intuitive, unconscious state of response to the musical material there is a suspension of the conscious self-expression of ideas, and a more complex state of self-expression is contained in the response to the material. By creating a non-specific task for the unconscious mind by asking 'what does the material need in order that the inherent qualities can be brought to the fore, thus brining the material into a clearer identity of its own?' the true work takes place in teasing out these qualities based on the unconscious knowledge of the individual composer and informed by his/her history, experience, values, assumptions and preferences. This view of composer in the role of facilitator (as one of the roles of the composer, the role of conscious organiser and decision-maker is another) highlights that by shifting the emphasis to that of the composer serving (albeit developing also) the material, there is a move away from self-expression of the conscious mind and towards a position which holds a small degree of sympathy with that of the aleatoric philosophy as outlined in Hoogerwerf's paper: allowing the sonorous and sensuous aspects of the sound or music to be of primary concern, to narrow the gulf between viewing the artwork as something removed from real life and every day existence to one which is connected to the world by virtue of the composer's experience of sound and living.

Aleatory, marbles, sound-objects and Spectromorphology:

By negating to continue with the process of allowing sounds 'to be of themselves' in completing Hothouses Bloom but instead reverting to imposing relationships upon the material (including that of the influence of ideas of shapes drawn from Smalley's ideas of Spectromorphology), this raises questions regarding the validity of the composer making relationships. Cage considers this in a lecture given at Julliard:

> 'In the case of the musical idea, one is told that the sounds themselves are no longer of consequence; what 'count' are their relationships. And yet these relationships are generally quite simple: a canon is little children playing follow the leader. A fugue is a more complicated game; but it can be broken up by a single sound: say, from a fire engine's siren, or form the horn of a boat passing by. The most that can be accomplished by no matter what musical idea is to show how intelligent the composer was who had it; and the easiest way to ascertain what the musical idea was is to get yourself into such

> a state of confusion that you think a sound Is not something to hear but rather something to look at.[28]

Yet the composer is able in making relationships to draw our attention to various aspects of sound or music that we may have been previously unaware. In considering a work such as *'Cendres'* by spectral composer Saariaho, where the piece is centred around the detailed similarities and differences in the timbral qualities of the cello, flute and piano, the composer has invited us to listen afresh to internal qualities of the sound. This work demonstrates that composer relationships need not involve imposition but can be in keeping with Cage's aleatoric philosophy of allowing the qualities of sounds to be of themselves as interpreted by Hoogerwerf:

> 'What remains then is a sensory concept of auditory materials: the particular sound and its unique characteristics – pitch, timbre, duration, intensity and so on serve as sensuous stimulators toward aesthetic satisfaction. All the acoustical details of the sound are absorbed, and which subordinate it to other sounds. For Cage, material is not an expressive medium; it is material per se'.[29]

In allowing Smalley's ideas of Spectromorphology to influence the material in an external way e.g. with regard to gesture, texture, concentration, diffuseness, emptiness, plentitude of an overall texture, rather than drawing relationships through the internal properties of the sounds themselves this has followed neither Smalley's approach to listening to sound nor Cage's approach in allowing the sounds to be themselves once again highlights a tendency to impose ideas rather than draw relationships between timbral qualities.

Reflecting on the exercise of recording marbles in researching the sound of movement and its relationship to rhythm in relation to this article also highlights difficulties in approach. Hoogerwerf says:

> 'And now we come to…the basic point of departure for the aleatoric view – the prime reason why the aleatoric composer employs random processes to create an art without syntax: if sounds are freed from individual control, representing no imposed relationships, they have everything in common with the sounds encountered in ordinary life. The responsibility for demonstrating beauty shifts from composer to listener, with the premise that there is *beauty*

[28]Cage, J. As attributed by Hoogerwerf, *'A Year From Monday',* pg. 97.
[29]Hoogwerwerf, Frank, W. pp.242.

> and significance in everything confronting the mind in reality – though that beauty is not necessarily of a logical, structured nature. It is the one-ness of art with life that is the goal of the aleatoric composer…For Cage, sounds must free themselves from technical shelter and artifical control, and must display themselves as they actually exist. In nature, he perceives a continuum of phenomena which defy neat notions of hierarchy and direction. To impose greater order on the integrity of pure sound creates a biased frame of reference, which will hinder true awareness perception…'[30]

In trying to divorce some aspects of the recorded marble sounds from others in order to replicate in the work, this has denied the true essence of the sound in nature; that it is the complex combination of all the sonic factors that makes the sound unique and interesting. Instead of trying to replicate elements of the sound to 'show' the listener, by using a recording or using marbles live in performance with the other music may have opened up questions regarding the similarities and differences of sounds in nature and the inherent properties of the sounds generated by players in performance.

Conclusion

As I have moved through this course of research and study, fluctuating between approaches, all of which have contained both elements of chance and of conscious acts of self-expression, many conflicts and half-formed questions have been clarified during this course of study. By clarifying a number of points regarding my compositional process this has allowed me to identify areas of interest in my work that need further investigation. This will include further exploration of aleatoric techniques and their impact on performance, notation and the compositional process (including researching improvised music), combined with a more in-depth examination of aesthetic questions posed by these activities (in particular looking at Cage's work). Analysing instrumental music using Smalley's model of Spectromorphology has lead to a desire to understand in more detail the methodologies and repertoire of spectral composers and the possibilities of manipulating spectral properties of instruments using electronics in live performance. Finally, more research into the implications of using 'found sounds' and recordings of environmental sounds with live instruments may lead to new directions in my work.

[30]Hoogerwerf, Frank, W. pp.244.

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