MUSICAL SCORE FOR THE DOCUMENTARY FILM

SIXTY MILLION YEARS

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MUSICAL SCORE FOR THE DOCUMENTARY FILM

SIXTY MILLION YEARS

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by

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Sixty Million Years

Advisor: Professor Robert Frank

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The desert tortoise has survived sixty million years, outliving the dinosaurs and several Ice Ages. The documentary film, *Sixth Million Years,* portrays its current existence in the Mojave Desert, Nevada, USA, and the desert scientists working for its survival. My thesis project is to compose and synchronize music for this nineteen-minute film.

The film opens with scenes of the desert and brief interviews with the desert scientists. We are then introduced to the tortoises: first seen in their shells, then emerging from these shells, finally as adults. The threats to the tortoises, from both humans as well as from nature (predators, wildfires), are presented in the mid-section of the film. Realistic solutions for survival are presented in the last third of the film.

The harmonic and melodic structure of the music is based on the overtone series. The opening scenes of the desert inspire use of quartal harmonies, exemplified by much of the music of Aaron Copland. Presentation of the tortoises in their eggshells is accompanied by use of the P8 and P5 intervals, the most basic intervals of the overtone series. A tortoise theme using the consonant intervals of the mid range of the series, the intervals of a M3, m3, and M2 is created to accompany the first views of the baby tortoise movements.

With the images of desert loss and wildfires, the musical pattern becomes ever more dissonant, using the intervals from the upper reaches of the overtone series: the Aug4/dim5, and m2. Unpitched percussion is introduced with mention of civilization encroaching upon the desert. The bassoon caries the tortoise theme, as in the manner of a *leit motif.*

In the third section, there are suggestions for possible solutions. The harmonies are major, and the tortoise theme and the desert theme are combined, suggesting that both the desert as well as the tortoise can survive together. The goal of the musical score is to evoke admiration for a creature that has survived for so long. In the final two minutes of the film, the tortoise theme is expanded, using the full palette of the orchestra.

The sound track was produced using industry standard, digitally sampled sounds at Ravel Virtual Studios, New York.

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One:Eight Productions, located in Fort Worth, Texas, did the filming. To my advisor for this project, Robert Frank, DMA, at Southern Methodist University, Dallas, Texas I wish to express both my thanks as well as my admiration for his skills in teaching me the intricacies of the methods of synchronization of music with film. His advice on the best orchestration to be used has proved to be invaluable.

Ravel Virtual Studios, in New York, did the digital realization of the score. In addition to providing a wonderful sound, this studio provided an extra proof-read of the score.

PRODUCTION CUE SHEET FOR SIXTY MILLION YEARS

The following cue sheet lists the dialog and primary aspects of the themes.

cinematographer made some edits the film, resulting in a variance from the stated times below.

The documentary may be viewed at the following site on the Internet: www.vimeo.com/75312067. The password is Desert.

MUSICAL CHARACTERISTICS	TIME	DIALOGUE/SCENE
SECTION I: DESERT AND DESERT SCIENTISTS		
Quartal harmonies: Flute, oboe, and soft strings for the first theme, which is desert scientists at work.	0:00	Images of desert as car arrives
Melody moves in fourths, to mirror the openness of the desert.	0:16	Todd: In the desert it takes slowing down. (Cam to Todd in his home.) It takes an accumulation of experiences. . . if you sense it the way I do.
Bring in piccolo and bells on the word **vibrant**.	0:27	Allan: How do you sense it? Todd: Very **vibrant**. . .and full of life. (Cam to desert sky.)
	0:42	Lesley: I think that a lot of the cities and the suburbs that are growing now don't

Underscoring with block chords, quartal harmonies,		have that development in mind of keeping communities connected to their outer environment. To really appreciate the desert you have to slow down. And step back, see what it has to offer, and take a breather, see what it has to offer.
	1:05	Begin sequence of desert images
Aerial theme in F major, use major seventh and major ninth chords to set up the melody. Eb7 for color and as V7 of Ab.	1:14	Aerial shot begins
Theme is lyrical. Idea is to fall-in-love-with-the-desert. Use Choir (vocal) and strings. Consider this as second desert theme: the desert as a visual experience and world of its own. Use block chords and low soft strings. G2 to G#2 in the cello, as half notes.	1:26 1:27 1:29	See desert beneath the left wing of the small plane. Go over a mountaintop, and see vast desert floor. Ken: What diversity we have, that we have species that can endure these harsh environments. . . the same fascination you get with polar bears and walruses, things that live on the polar ice. . . to me the desert is just as challenging an environment, so I just want to know how they do it.
Back to quartal harmonies, the desert-scientists-at-work theme.	1:50	Cam to desert with views of desert scientists at work.
Bassoon enters briefly.	2:04	Tortoise in a burrow, not moving, not well seen.
	2:16	Better image of tortoise in the burrow
	2:19	Allan: What does the life of a tortoise look like?
SECTION II: BIRTH OF THE TORTOISES		
Underscoring, quiet chords	2:21	Todd: It's always a challenge to figure out . . . where should we jump into the story.
Overtone series with P8 and	2:27	So, lets start with an **egg,** cause that's

P5th, in strings and winds. Use bells for two chords. Start this section with the cue "**egg**"at ***f***. Then decrease the volume so that the speaker can be heard.		kind of a fun place to begin. (Cam shifts to a group of five eggs in a laboratory tray, where they have been incubating.)They have a hard shell, and it's a calcium based shell. And, a clutch of eggs in the Mojave Desert is somewhere between four and seven eggs at one time.
Begin the baby tortoise theme, using pizzicato strings. A simple melody, which moves primarily by whole step, ***p***, in F major. Melody is in C4-C5 range.	2:43	Cam shows small portion of the shell being broken open as tortoise pushes its way out. (Todd still speaking.) Almost every year they put out one clutch.
Diatonic melody, within the range of a third.	2:46	No voice. See emerging view of the tortoise coming out of its shell. Tortoise struggles and tries to stand up
Continue melody	2:57	Full frontal view of tortoise, who seems to be looking right at us.
Underscoring, using the synthesizer keyboard sounds.	2:58	They're laid in May and it's about sixty days to incubate, where ever the female lays them. The sex of the young is determined by the temperature that the egg is incubated at.
Underscoring continues.	3:05	(Cam to Todd and off the tortoise). There's a critical point and it's give or take an average temperature, and either side of that temperature, it's a male or a female.
Use a "wash" in the flute to announce return of the "baby" tortoise theme.	3:15	Cam back to tortoise, now about 1/3 out of its shell.
The baby tortoise theme continues, then to underscoring	3:28	During that time, when they're a couple of inches long, they've been referred to by one scientist, Dr. Naegi, as "little raviolis".
Underscoring	3:37	Cam back to tortoise, who blinks left eye. Cam back to Todd. Todd: They're soft on the inside and crunchy on the outside and everything in the desert will eat them. Then they grow on the order of millimeters a year. So it takes them up to 12 to 18 years to reach

		maturity, to where they're reproductive size. The whole game for tortoises for some. . .
Use bells with **sixty million years.**	4:02	**Sixty million years,** has been, once you get to that size, you're almost impervious to any other predator that's out there.
Tortoise theme with the glockenspiel. Hear bassoon in the bass, as an anchor to the theme.	4:09	Cam to laboratory basin. All tortoises have hatched and are moving around. Cam on tortoises until
Desert theme 1 (scientists-at-work theme)	4:23	Black screen for 2 seconds.
SECTION III: ADULT TORTOISE AND THE SCIENTISTS AT WORK		
Desert theme (1) in winds and strings continues	4:25	View of desert through the low-lying desert vegetation. Cam on the working scientists. Hear footsteps.
Underscoring with block quartal chords	4:31	Scientist: (A woman.) This is a traditional VHF transmitter. It's got three antennae with a radio receiver, and it works great. (Still hear footsteps.) It's always a tradeoff when your receiver is on. Cam to desert view with mountains in the distance and low height vegetation. The sky is a clear blue with no clouds. The woman and Todd are dressed in desert work clothes . . . long pants and long sleeves.
Underscoring, with quartal harmonies	4:50	Woman: Smaller and more affordable you get less range, versus heavier, where you can hear a couple of miles/kilometers out. But for these flat bottom areas it works just great.
Underscoring	5:02	No voice over. Views of the scientists working
The transmitter is sending out a signal which is Ab5	5:14	Hear sounds of the radio transmitter (Ab5). Cam close-up of the transmitter in the scientist's hand.

Begin the **adult tortoise theme**, also moving within the range of a third, but now lower, in the C2-C3 range. To match the Ab of the radio transmitter, the theme is now put into Ab, still moves by step, but the contrabassoon is brought in, to create a duet between the bassoons.	5.20	So, obviously the sound amplifies as you **get closer, (to the tortoise),** so you have to turn down the gain to get the right direction.
	5:44	Sounds of the receiver, footsteps, and views of a living but not moving tortoise.
Desert-working theme in winds now with trombone in lower register	5:49	Cam on adult tortoise, not moving. Remarkable how well it blends in with the brown-gray desert floor. Scientist: Every time we locate an animal we record their behavior, and some descriptions on their habitat.
	5:57	Cam close-up of the head of the tortoise, with scientist still speaking. . . "their behavior changes as the year goes on".
Underscoring with soft adult tortoise theme in lower register. (Theme on bassoon is punctuated with single notes an octave lower, by contrabassoon).	6:03	Cam close-up of tortoise. Scientist: In April and May, that's primarily when they would be eating. That's when the annual vegetation is available to them. As it gets hotter their activity decreases, and they spend a lot more time underground. Any time we find an animal that's in a burrow, and the burrow is next to vegetation, we're tracking which species they're selecting.
Continue theme	6:26	No voice, desert sky Close-up of adult tortoise, from the rear, moving slowly toward a bush/vegetation.
Desert theme 1	6:32	No Voice. Cam close-up of profile view of moving tortoise.
Adult tortoise theme, with bassoon and contrabassoon only, first adagio, then as tortoise goes uphill a faster tempo.	6:44	**Tortoise going uphill**. (We have this shot again, in the closing credits.)
Continue theme	6:53	Tortoise exits screen
Begin desert theme 1	6:54	Desert vegetation
Continue theme	6:56	Moving adult tortoise, who turns head

		and eats vegetation.
Desert theme fades to underscoring with the synthesizer	6:59	Desert scientists' conversation. Most of the words are NOT clear. They are working in the field. We hear "Line two".
Underscoring	7:07	Second (female) desert scientist with measuring equipment. Mountains visible in the distance. Blue sky.
Underscoring, with adult bassoon theme in the lower register, [C2-C3] with contrabassoon playing whole notes and bassoon with the quarter note theme.	7:11	Lesley: My colleagues and I (Cam still on desert) have been studying the tortoises, and some of these broad burned areas, and watching how they move around the habitat and the adjacent unburned habitat. I'm (Cam back to Lesley, out of desert now in her home setting) mostly the plant part of things, but I'm understanding how the plants are changing. And together we're trying to understand (Cam back to desert) how this habitat is still suitable for supporting tortoises.
End with a **tritone** (D-Ab) to emphasize that recovery may be in doubt, at ***p***.	7:39	Lesley: (Cam to home base) 'Cause, ultimately, we want to **ensure the recovery** of the tortoise.
Desert theme 1. With **and then** go to quiet underscoring.	7:43	Scientists at work. Second woman scientist: **And then** we have a plant again from 4.5 to 9, and then a dead laria from 4.861 to 4.863.
Underscore with synthesizer	8:00	Cam to brown (? dead) bush. Scientist: All this cover here, this is buckwheat. It's an annual, so, like most of the annuals in this area, our rains came so late that everything has already grown and senesced and what's left is the perennial growth.
Hold whole note chords with the 4th as the interval, in the C5 register. Continue the quartal pattern of 2 note chords, but in bass clef, on the synth.	8:04 8:15	Lesley: Here's some of the invasive annual grass. (Cam close-up of Lesley's hand holding the grass). Lesley: Red Grum, or bromomadracentesis. . .that's the scientific name. . . and there's just not very much of it this year. Again, because of the rainfall patterns we saw this year.

Continue same pattern	8:14	Lesley: The work that I do is to study whether some of the methods we use, like putting seeds back out in the landscape will be germinating and growing into plants. Whether the whole process of recovery and regeneration is actually happening.
	8:40	Cam to Lake Meade Nursery and another (male) scientist.
	8:51	Scientist: (male member of the team) Right now we are at the Lake Meade Nursery, in boulder City.
Alternate between whole note (on the synth) and quarter notes outlining the pattern of a quartal chord, in keeping with the idea of desert theme 1.	8:52	Cam on germinating plants. Scientist: We have our plants here that are in plant bands that we are going to use for a common garden study. A lot of the desert is covered with ambrosia and laria. They grow in the same environments.
Use Eb as an octave, (Eb5-Eb6), to accompany the yellow flower.	9:12	**Spectacular image** of a yellow flower. Scientist: They all grow together, and they all form this system that tortoises can live on. Screen lingers on beautiful white flower, following the brilliant yellow one.
Enter clarinet on a low note, and then it and flute move up towards a Bb5 with a **tritone** interval between them.	9:22	Allan: (to Ken) What are some of the biggest **threats** to the tortoise population?
SECTION IV: DESTRUCTION		
Bb 5 trill in the piano, ***mf,*** and in flute, also ***mf,*** to coordinate with the cue **people**. Use a 6 note set which will be used again in the wildfire/destruction scene.	9:26	Ken: (in the garden of home) **People.**
Bring down all instruments to ***p.*** Piccolo trill.	9:28	Cam to desert floor showing trash, discarded shotgun shells over a rocky surface, broken glass, parts of an engine,

		broken glass.
Begin **percussion,** as ***sf*** *to* ***mp,*** using initially just the snare.	9:35	Allan: Can you elaborate on that?
Snare drum alternates 16th notes with eight notes, using a grace note at the beginning of the pattern. Minor triads ***p,*** in the synth, using the common-tone technique to connect the triads.	9:39	Ken: **Everything we do.** Cam on Ken, then back out to desert, with images of debris, old pieces of wood, Coca-Cola bottle, part of a carton.
Continue pattern.	9:45	Ken: I was out there this morning driving around.
	9:48	Cam to highway with truck traffic moving at high speeds. We're moving our municipal areas out further and further into the desert.
Aerial view, with desert theme 2, (also "aerial") theme now in F minor, for a few measures. Idea is show civilization encroaching on desert.	9:50	Ken: We've got **power lines.** (Cam shows the power lines) Ken: Every time we build an incursion into the desert it brings along with it a way for things to traffic with it. So we get invasive species, we get subsidized predators.
Use F minor 9 here	9:54	See desert from the small airplane
Winds with half notes, synth with whole notes, ***p***.	10:05	Raven image, as a profile view. Back to aerial view, and hear Ken. Ken: These are animals that have been here forever, you know, in conceivable time, but their population numbers are up, because we have subsidized them with food and water.
Same pattern	10:16 10:26	Ken: We see the desert as a vast open place with nothing in it, but I can tell you going over it and looking at the top of it, there's almost no place where no one's been.
Resume **common tone minor triads,** as whole notes, in the synth. Goal is to evoke sadness at loss of the desert.	10:30	(Cam on **extensive solar panel instillation**) Ken: If there's a power line through the valley (Power line and accompanying road shown) . . . there's always an access road with that line.
Common tone triads	10:37	Ken: (Aerial views continue) There's always somebody enjoying the desert.

continue pattern.		There's always an ATV somewhere. The numbers of places I can think of which are untouched are nearly zero.
A **high solitary C** (synth) as a **whole note,** over a F2-C3 chord in the bass, ***p***.	10:50	Close up of a Yucca plant, **solitary**, against a vibrant blue sky.
Half notes in treble clef (synth), using motion of half step up or down, with leap of an octave, over whole notes in the bass (synth*), piano.*	10:07	Lesley: The greatest threats that I study are the invasive plants that come in. (Cam to plants in the Lake Meade Nursery). Lesley: They establish much better than the native species. Typically, after some kind of disturbance, or, after a heavy rainfall, they become prolific throughout these struggling communities.
Bring in **irregular rhythm in percussion** (snare), at ***p***, on cue of **wildfires.**	10:56	Lesley: Related to that invasion is the predominance of **wildfires.**
Begin pattern in winds and strings, of the six notes, (F,G,Ab,B,C#, D) at a ***f*** dynamic. Pattern goes up a half-step in each measure, for 3 measures. Snare is a constant trill until end of section, at a ***mp*** dynamic,	11:22	Images of wildfires.
f decrescendos to ***p***.	11:33	Lesley: In 2005 and 2006 we had about a million acres, which burned in the North East Mojave Desert, which is unprecedented, since the records started in the 1980's.
Strings and winds hold on a whole note (Db), all octaves.	11:55	See image of a burned tortoise shell on the desert floor.
SECTION V: RESTORATION, REPAIR, AND RESILIENCE		
Begin pattern in the strings, ***p***, of eighth note minor triads going to a augmented triads. Tempo is brisk (quarter note = 94). Start with E (3) minor and continue pattern until G3. Use guitar for whole notes to	11:56	Todd: Climate variation has occurred since the beginning of time. . . and animals have succeeded, and tortoises have actually done it for sixty million years. (Cam back to Todd at his home).

identify the root of the chord. Then at G# resume the common-tone minor triads.		
Triads in the synth	12:06	Todd: Part of what's happening now is that some of the changes are expected to be fairly rapid. The question on whether the animals can keep up with the change in the plants and the temperature, and the change in the rainfall in the landscape is a big question. (Cam, to dry, perhaps dead desert bush, only branches, no leaves).
Underscoring with the common-tone minor triads, as whole notes.	12:30	Todd: There's lots of modeling going on to try to understand what the prospects might be. How likely is it for things to make it, but at the same time,
Hold B as octave, (B5-B6), ***p***. **Irregular rhythm** in snare to correlate with **fragmenting**.	12:40	**WE'VE CHANGED THE RULES ON THE LANDSCAPE**. The way we've changed the rules is by putting in and **fragmenting** the pieces of habitat we have.
Underscoring	12:47	Aerial view of desert, some settlements with green grass in the foothills.
Whole notes on the synth, ***p***.	12:48	Ken: THE FACT IS WE'RE LOSING TORTOISE HABITAT to some anthropogenic uses. (Cam to desert and the developments in the foothills.) Whether that's construction of a highway, or a new high-speed rail line, or solar facilities, (Cam to Ken and then back to desert showing EXTENSIVE SOLAR FACILITY.)
Continue same pattern	13:01 13:08	Ken: (Cam on another solar facility) We're losing tortoise habitat, and so we need to find a balance with how does that (development) happen, and how do we preserve habitat. Some of the research we're doing is looking at habitat and saying, if you had your choice, where would it be? Right here? Or, would it be better five miles over; would that be a better connection? Not just for tortoises, but for a number of species. We're looking at twenty five or so right now.
Underscoring	13:29	Ken: Looking at the collective gene

		pool, and asking how that lays out. There's more than one animal out there and I think that's important to consider.
Underscoring	13:35	Todd: So the question is, are we fragmenting the landscape to the extent that in combination with climate change, will it make it more difficult for the animals, or will they be able to move in the way they need to, on their own, to respond to the changes that are likely to happen.
	13:45	See desert, and a tortoise burrow.
Quarter notes and octaves in the piano. A new color of instrument (the piano) is needed to match the more vibrant colors brought in by this photograph.	13:51	Close-up of adult tortoise, in color, at the opening of a burrow. Tortoise is a rich green, surrounding burrow is a rich red, and floor is grayish rock. Image is a photo, not a live shot.
Underscore with synth and piano, at ***p*** dynamic.	13:52	Lesley: For a species that's been around for many millennia (cam still on the "noble" tortoise), it may suggest that our system has been changing like this in the past, (Cam to Lesley), but it may signal that there's something we should be paying attention to.
Add in clarinet and oboe, in their low to mid registers, in whole notes, at ***mp*** dynamic.	14:11	Photo of dead tortoise on its side, on the desert floor. Lesley: There are some rapid changes occurring just within the last one hundred and fifty years, that seem to be occurring more rapidly that we would expect, so we need to be aware of those. . .
Tritone in synth (Gb-C), then a wash in the clarinet is a return to desert theme 1.	14:22	Pause, and then another dead tortoise on desert floor.
Desert theme 1 in winds and strings. Begin tortoise theme in bassoon and contrabassoon, so that the themes now combine.	14:29	Lesley: We need to know how humans fit in that picture, not only in terms of how we are contributing to that rapid change, but also how we are going to deal with it.
Continue themes.	14:42	Cam back to desert, with tortoise burrow in center of shot.
	14:49	Cam close-up of live tortoise, in burrow, awake, looking directly at us.

Bassoon solo with adult tortoise theme.	14:49	Cam to open desert, **live tortoise moving** on rocky ground, looking all around.
Continue theme.	14:55	Frontal shot of tortoise moving toward us.
Underscoring with synth	15:00	Todd: (Cam on Todd) They have federal protection, under the Endangered Species Act, (Cam back to tortoise)
Continue same	15:01	Todd: as a threatened species. There are imminent threats out there that if we don't manage things properly, we could push them toward extinction, which is what we are concerned about with the Endangered Species Act. We want to keep them away from extinction.
	15:15	Todd: The Fish & Wildlife Service, since 1990 has been, at the federal level, in charge of protecting tortoises throughout the United States, and they also have protection in all the states where they occur
Shift to C major, to match the hope and positive suggestions that Ken has. Just use synth at first, then bring in **percussion**, with snare, at ***p***, on **trash**. Keep harmony simple: fifths in the bass clef, and a gradual ascent of the scale in the treble clef, starting with E3.	15:24	Ken: If you know there are sensitive species out there, stay on the route designated for recreation. Pick up your **trash**. Don't do things, which are going to cause a predator to increase in capacity. Lets get together and think about smart ways to develop. Are we using the landscape to everyone's benefit? So, I think those are things we can collectively think about.
Continue upward march through the C scale, bring in piano, on G5, finally going to G#5.	15:58	Lesley: I'm seeing less and less wonder for the world around us. I hope that changes, because if we lose that, then we lose a connection with the natural world around us. When we lose that it impacts us as human beings.
Again **combine** desert theme 1 with tortoise theme, with bassoon having quarter notes, (quarter note = 76), and contrabassoon having whole notes. Use the quarter note triplets in the bass clef of the synth.	16:15	Cam in adult tortoise moving directly toward us. Todd: As **stewards of the landscape** here, [tortoise moves head to look around], and as a country we decided that we would protect animals from extinction.
		Cam to desert foothills, and then comes

Now contrabassoon has the quarter notes and bassoon has the whole notes.	16:20	in to focus on the adult tortoise, moving over ground. Todd continues: We made a really powerful law to do that, and I think it's a credit to our nation that we have done something like that.
	16:31	Tortoise close-up
Tortoise theme ***mf,*** and now bring in the **strings**, also at ***mf.*** Synth now has the tortoise theme as well. Use triplets in the synth bass clef, and viola, cello and double bass as well.	16:32	**Tortoise coming right toward us.** The pace is steady and determined. Todd: (Cam still on tortoise) It indicates our value of nature. And, it's also practical. (Cam now on Todd).
Begin a series of seventh chords with a 4-3 suspension over the seventh chord, to produce a slightly sad, vulnerable sound. Begin with Ab7, hear the fourth (Db4), going to the third, (C4), down to a 4-3 G7 sus, and then we hear as the last chord in this section a G7 chord, which sets up the entrance for the final two minutes of the score, which is primarily in C major.	16:40	Todd: Do we want to be the group that ends sixty million years of survival for a genetic line? That may sound esoteric, but, these guys have been around for a really long time.
SECTION VI: CLOSING CREDITS		
Adult tortoise theme is heard in trombone, piano, synth pad and strings. Choir (vocal) line is whole notes, in counterpoint to the main tortoise theme.	17:16	Noble image of the tortoise, who seems to standing on its hind legs. This is the same photograph we saw earlier.
Desert theme 2 returns, because this image is a celebration of the desert itself. Theme is built around the major ninth chord in the brief key of F major.	17:29	Sunrise in the desert
Use Eb7 to get to Ab9	17:34	First actual appearance of the sun, rising behind a mountain.
Use Db major 7 to Db minor 9	17:44	Close-up of tortoise at rest
Begin expansion of the tortoise	18:01	See tortoise from the rear, with the

theme with full chords in the synth, and add in gradually all of the instruments.		leathery legs pushing against the rocks, to climb uphill.
Bassoon and contrabassoon playing in unison	18:07	Slow climb continues upward.
Go to Ab7, from a C chord, to impart a sense of overcoming struggle.	18:27	See tortoise, rocks, and blue sky in background.
Bring in (vocal) choir. Use the Aug4 with a C chord as open fifths, and octaves in base.	18:45	Climb continues. Begin the list of credits on the left of screen.
Begin cymbals and drum trill. Continue to the end. Use all of the orchestra, at ***ff***. In the piano, synth, cello and double bass, use the overtone series in P8 and P5th. Start on E2, with contrary motion in top voice, [E5, F#5, G#5, A5] starting with Ab5 over Eb2, then A5 over D2 then Bb5 and B5 over Db2, then both ending on C [C2 and C6]	18:47	Credits on left on screen, and tortoise climb on right of screen continues.
Final C in all parts	18:57	Tortoise exits
With C in all upper parts, the strings and piano and synth continue the pattern on P8 and P5th, moving from C to F, then back to C, giving us a plagal cadence.	19:00	Black screen, with continuation of the credits.
	19:13	Film ends

INSTRUMENTATION

PICCOLO
FLUTE
ENGLISH HORN
Bb CLARINET
BASSOON
CONTRA BASSOON

HORN IN F
TROMBONE

TIMPANI

PERCUSSION
(Synth bells. Synth Glockenspiel,
Suspended Cymbal, Snare Drum, Bass Drum,
Piano, Synth Pad)

Voices

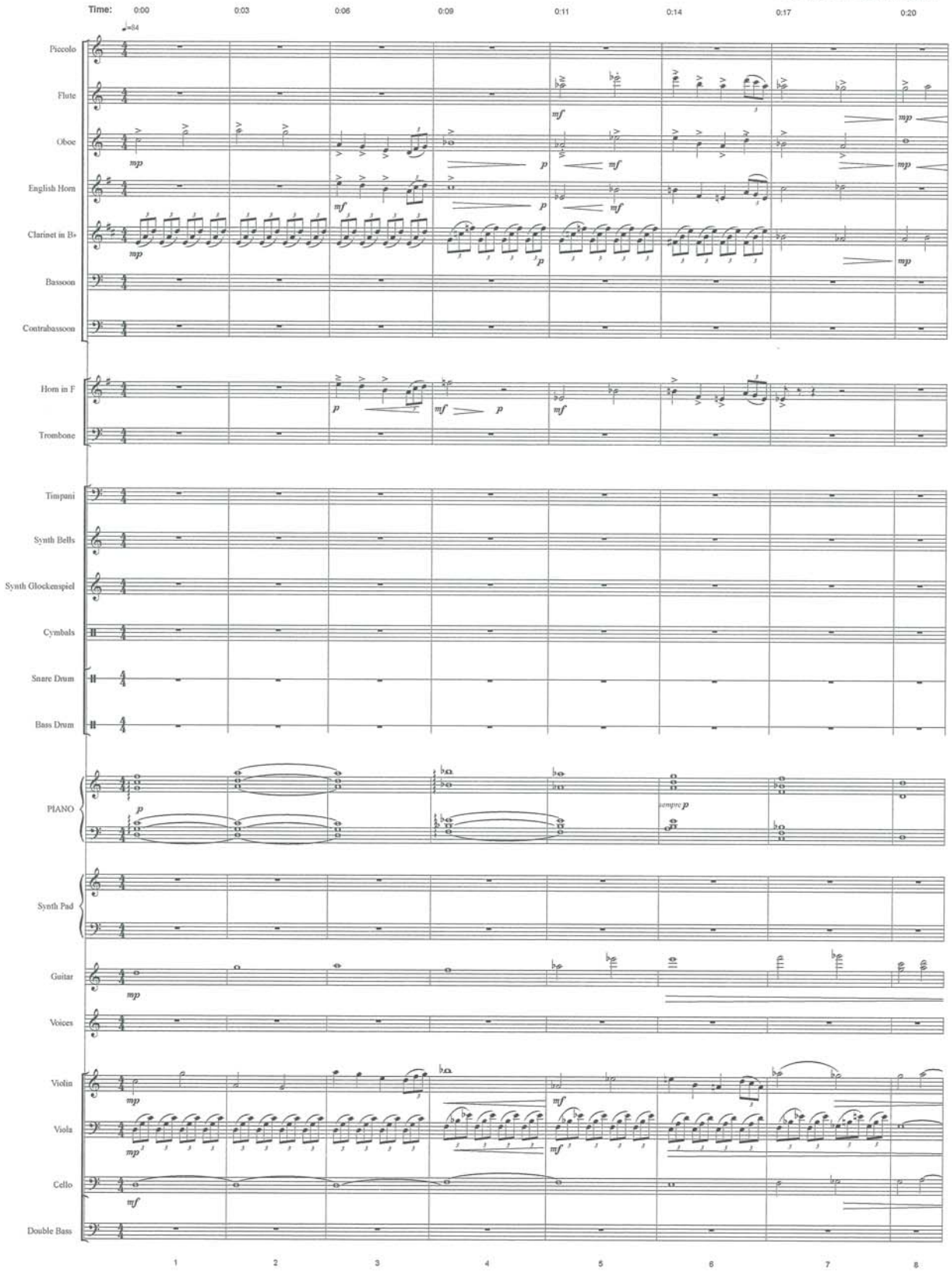
Guitar

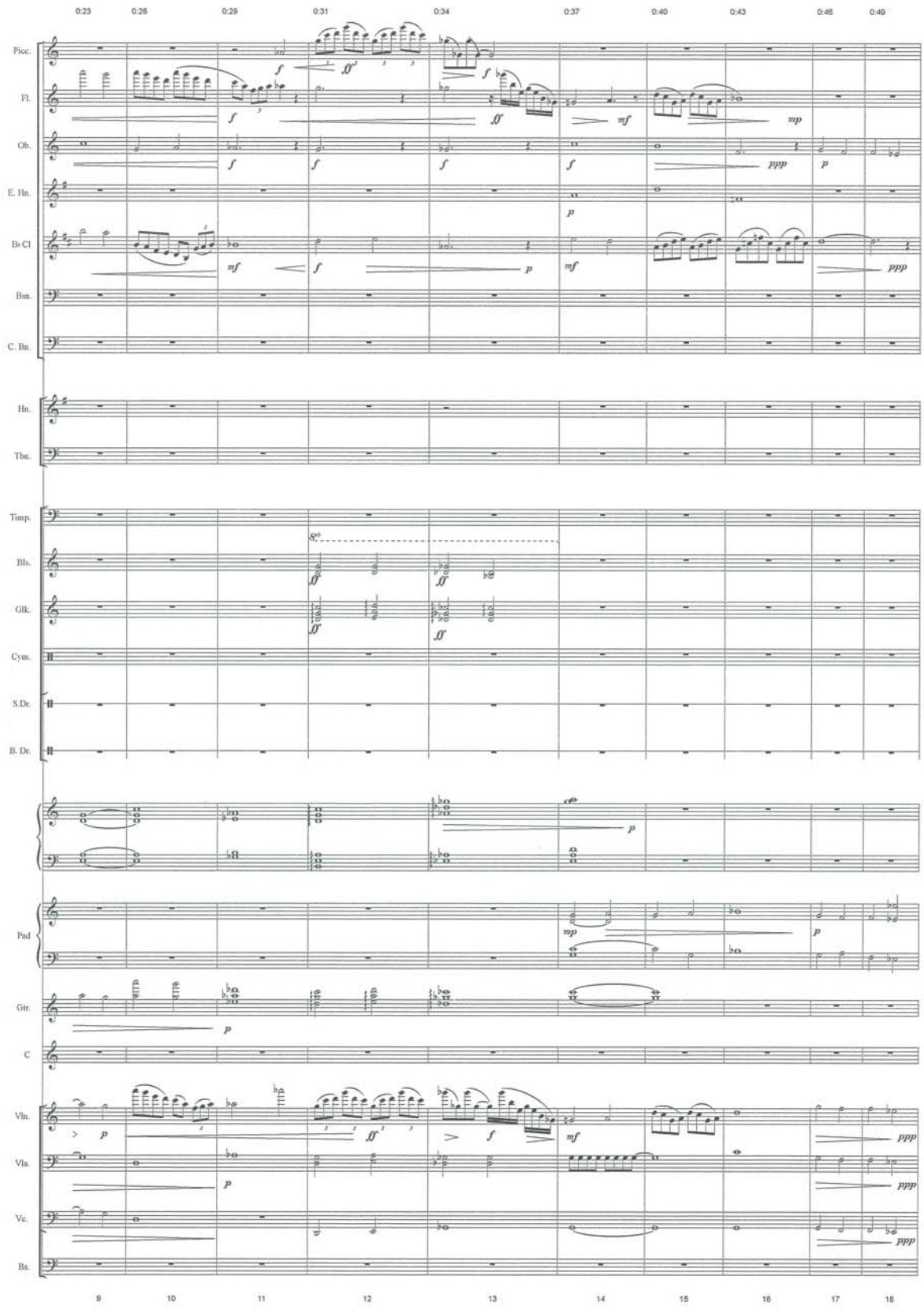
Violin
Viola
Cello
Double Bass

Note: Because this is an electro-acoustic sound track,
unison and divisi markings are not included.

SIXTY MILLION YEARS

ELLEN SELDIN

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E. Hn.
B♭ Cl
Bsn.
C. Bn.
Hn.
Tbn.
Timp.
Bls.
Glk.
Cym.
S.Dr.
B. Dr.
Pad
Gtr.
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Vla.
Vc.
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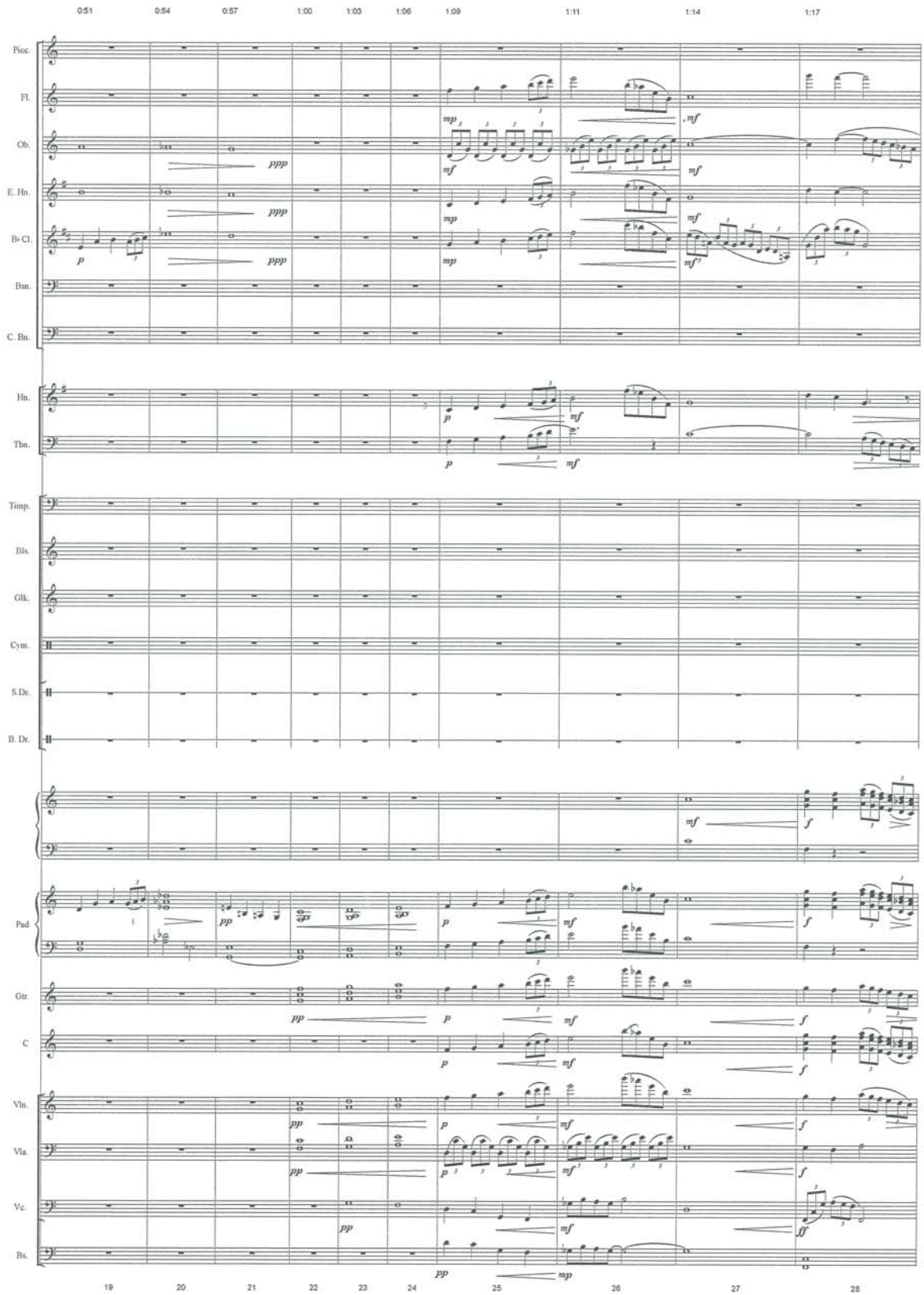
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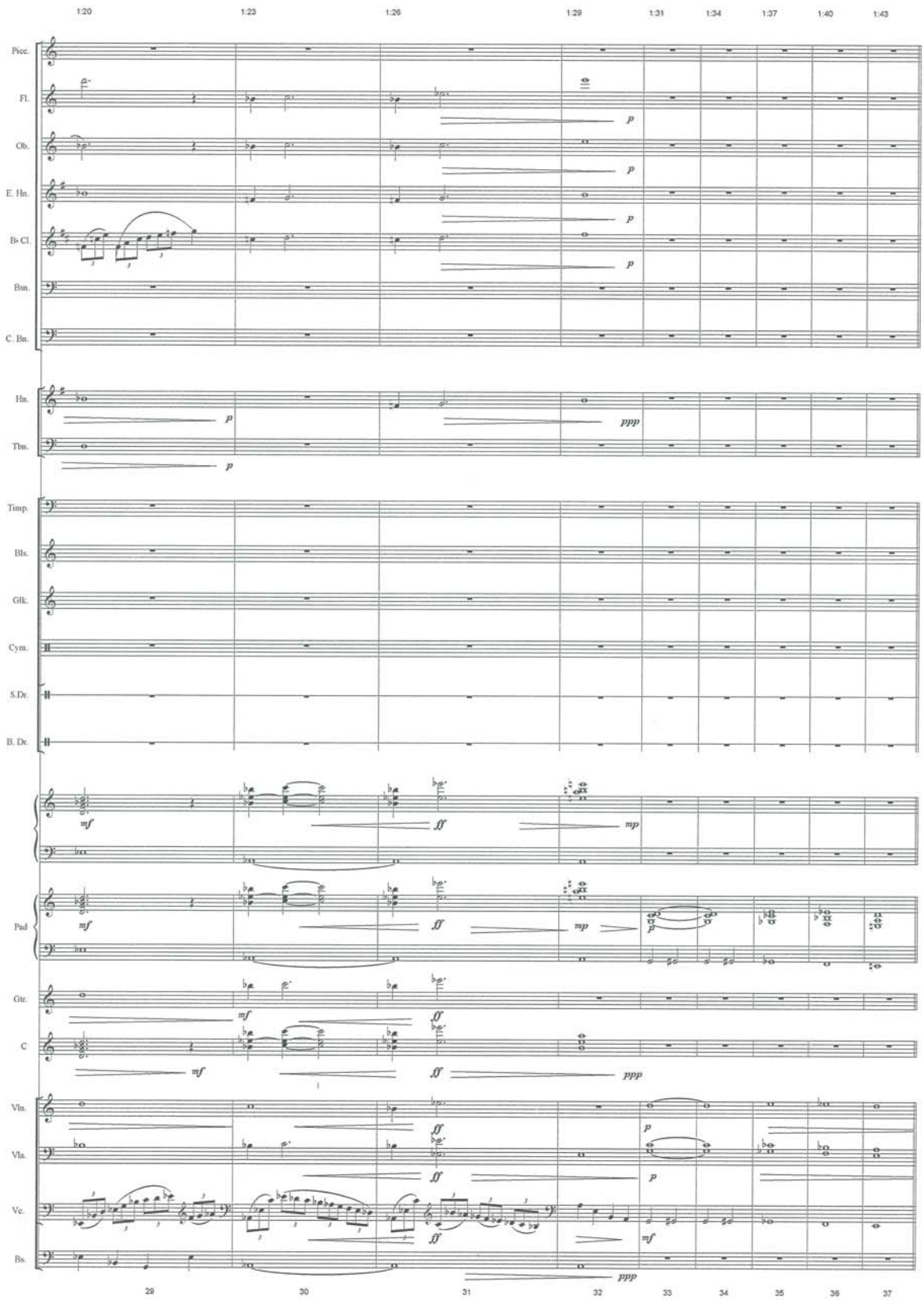
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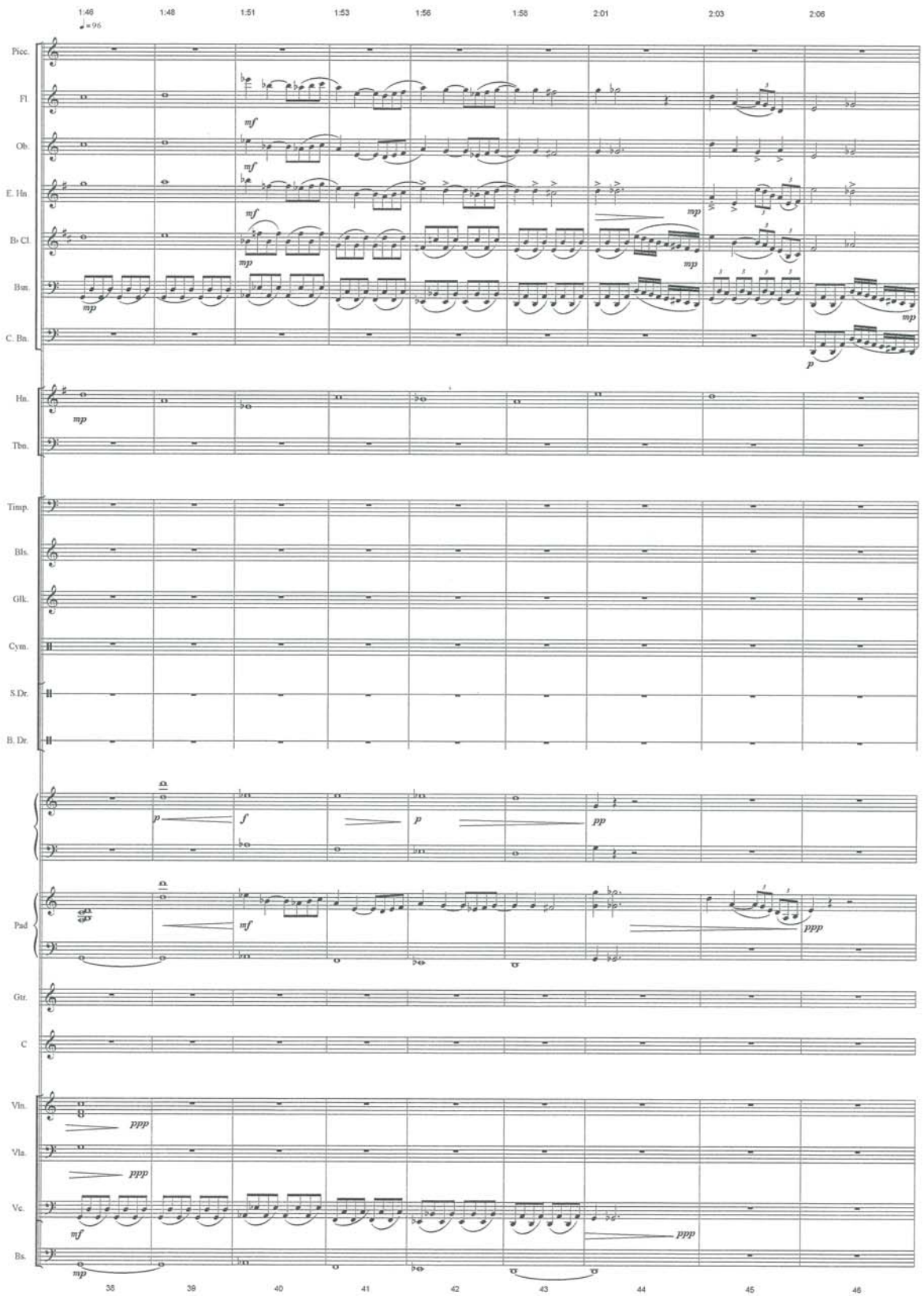
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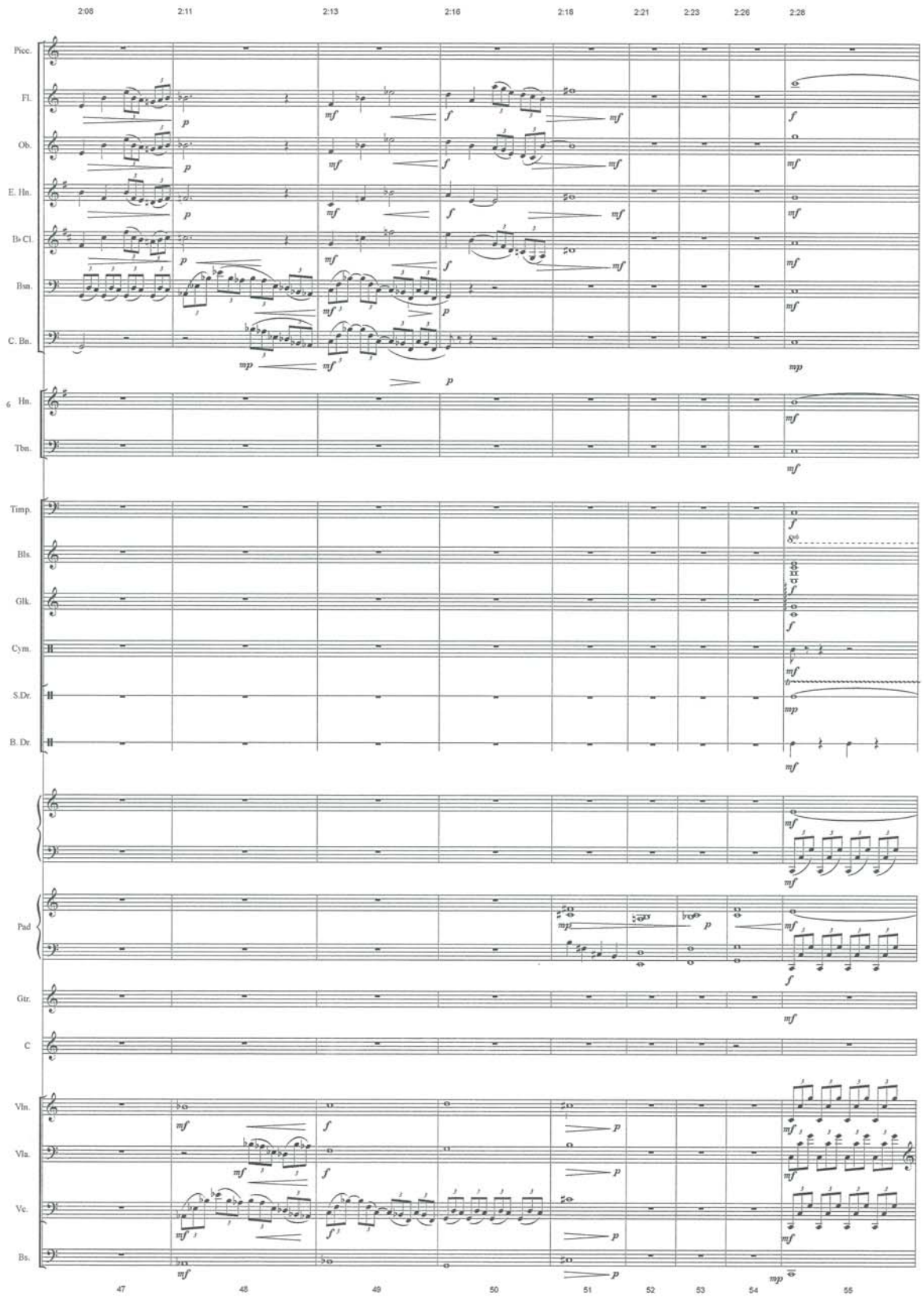
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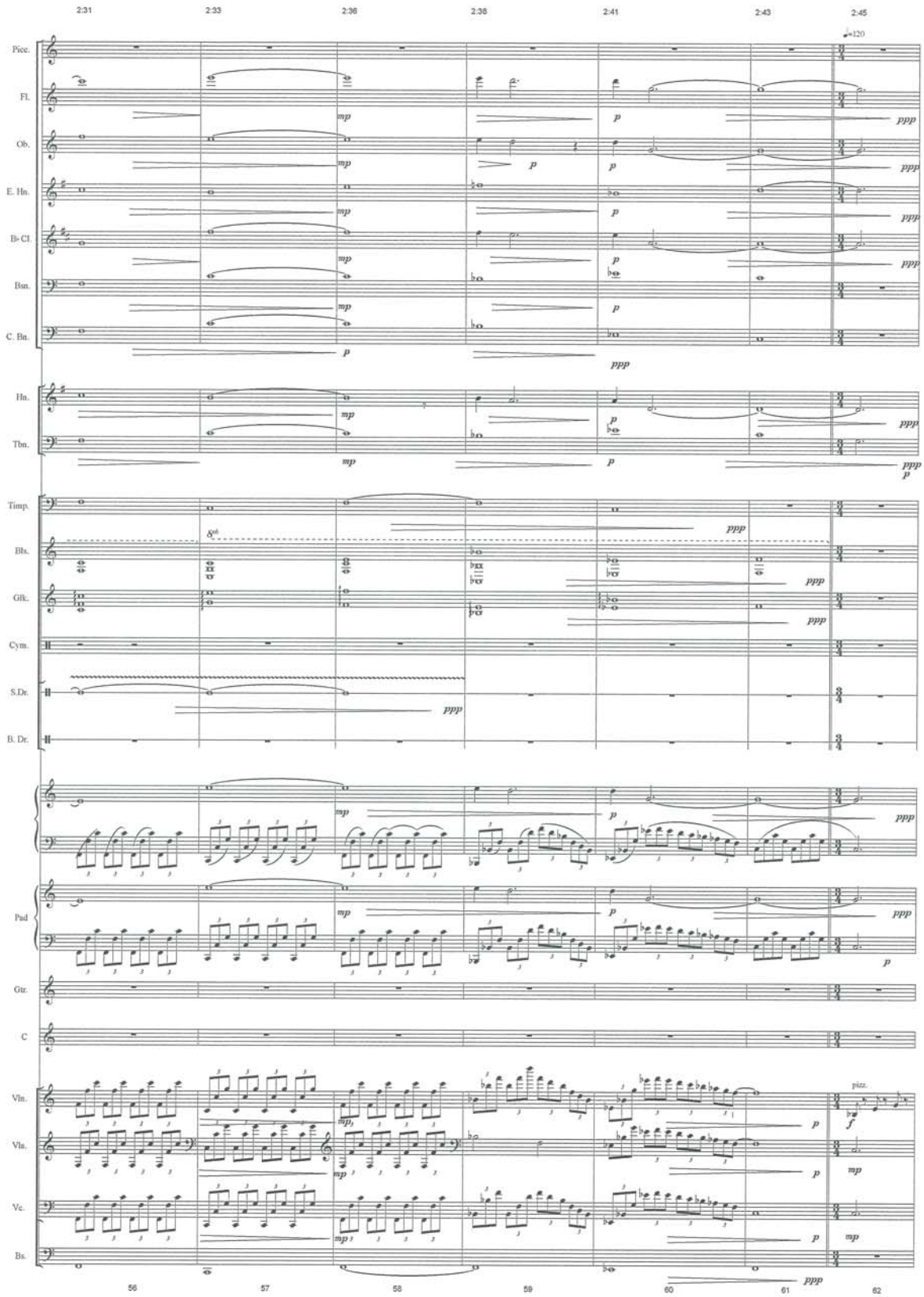
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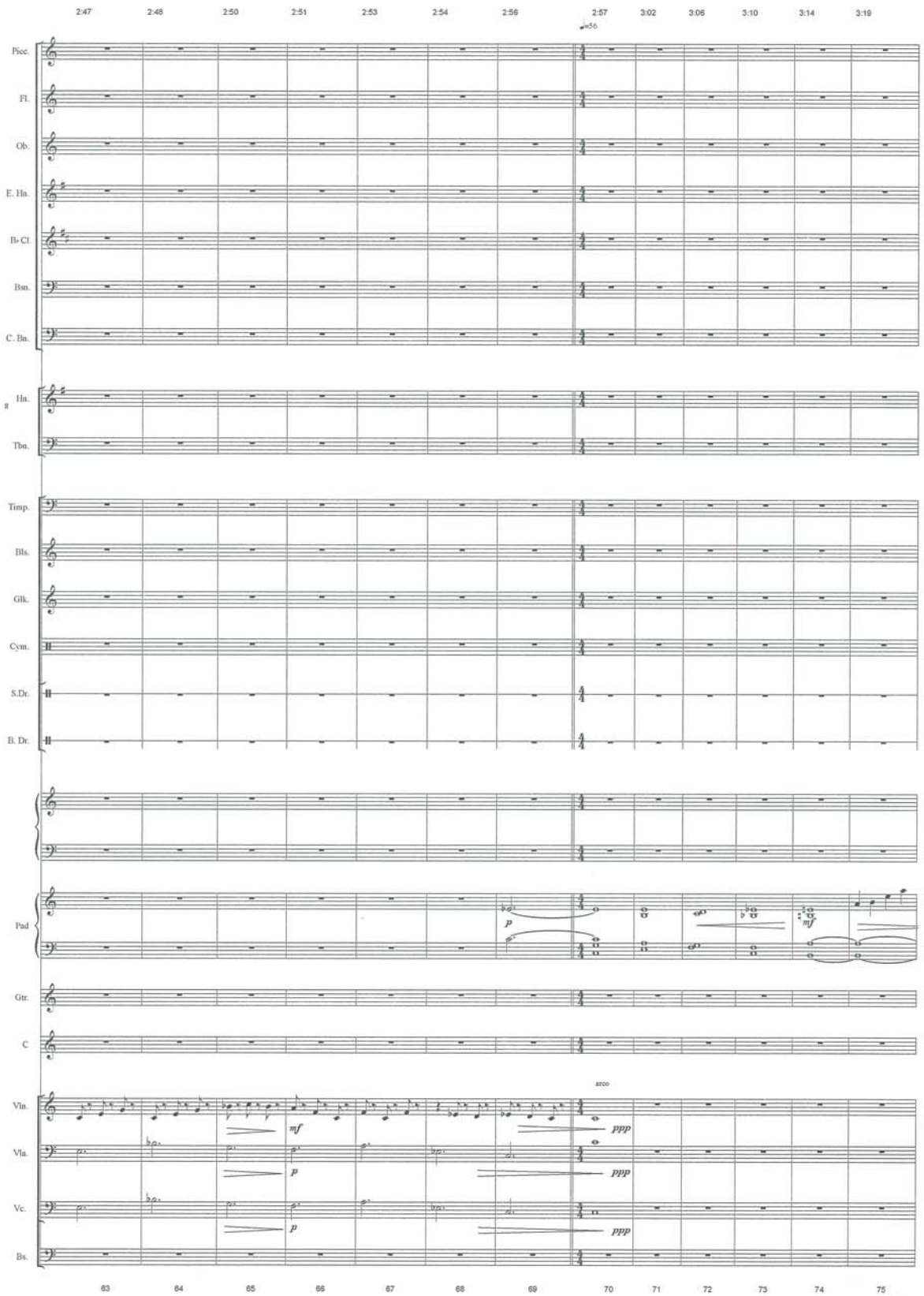
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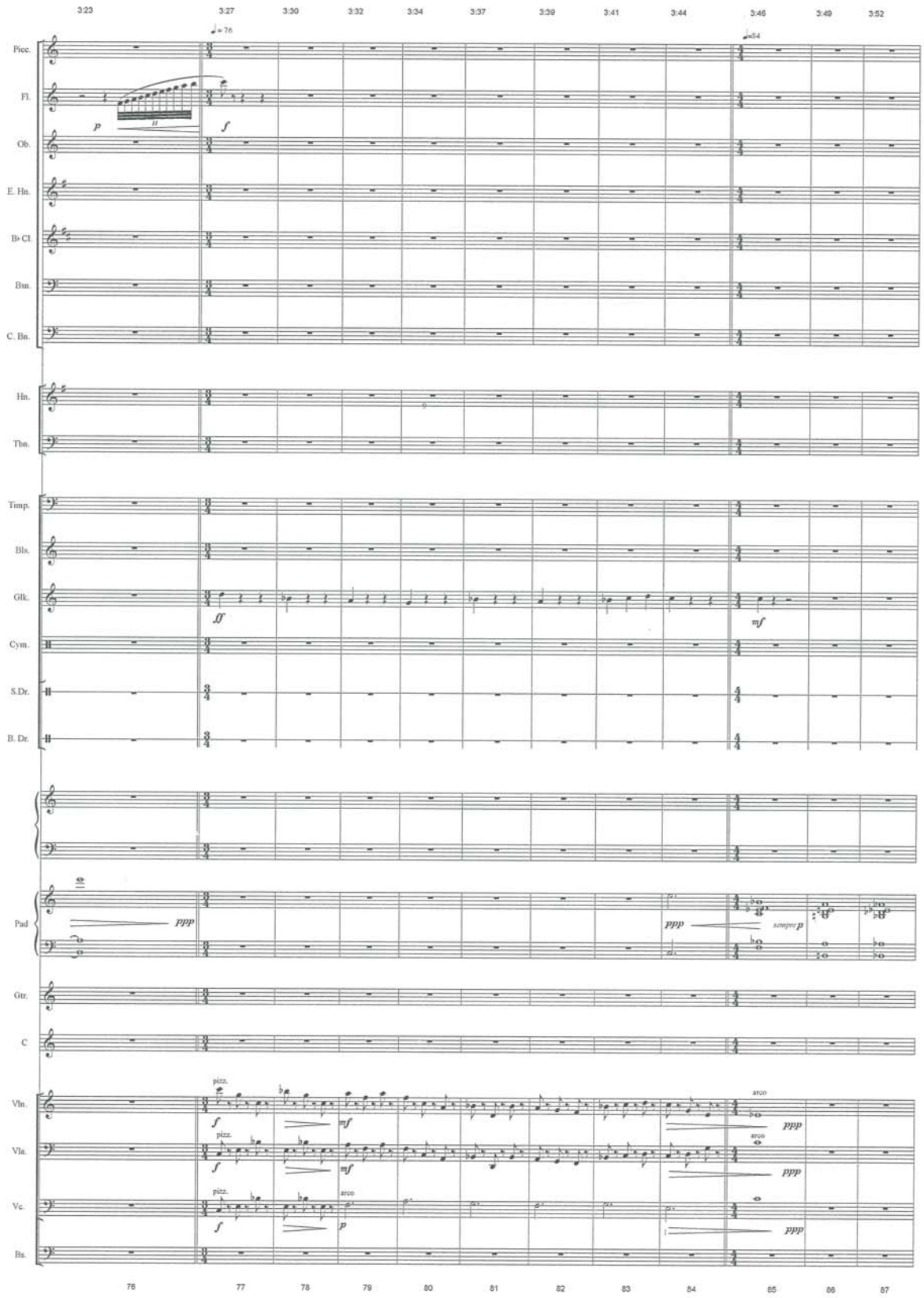
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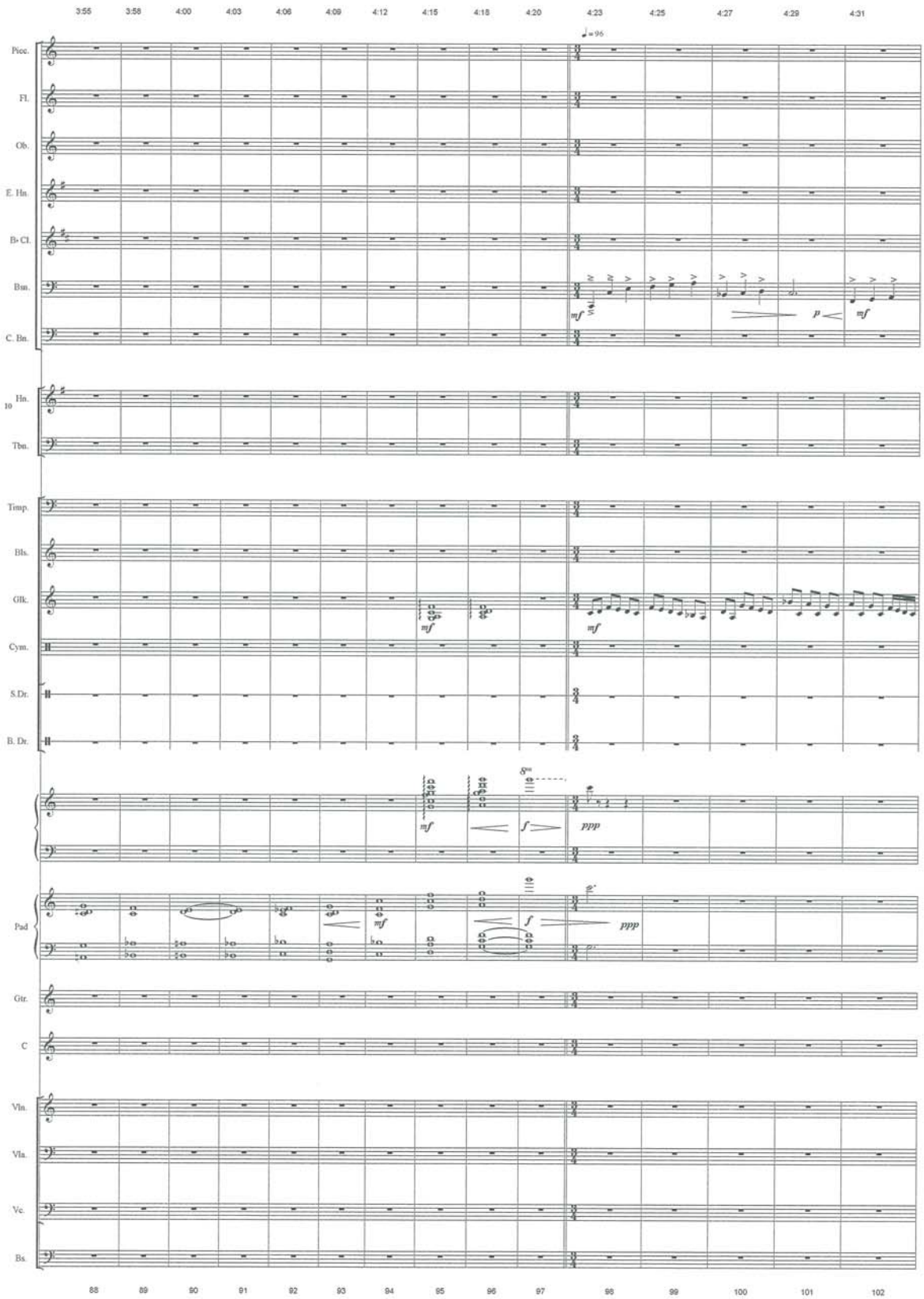
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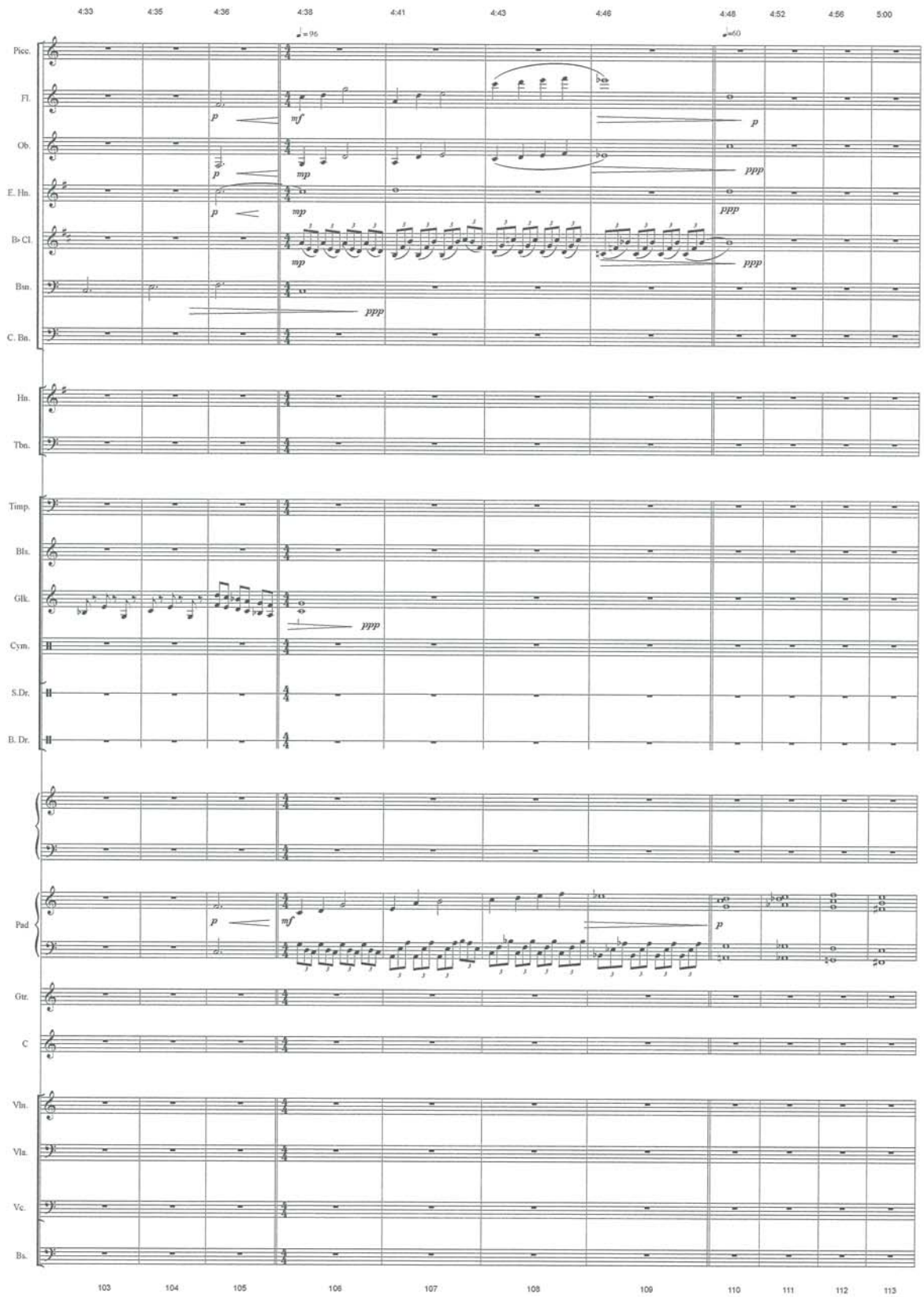
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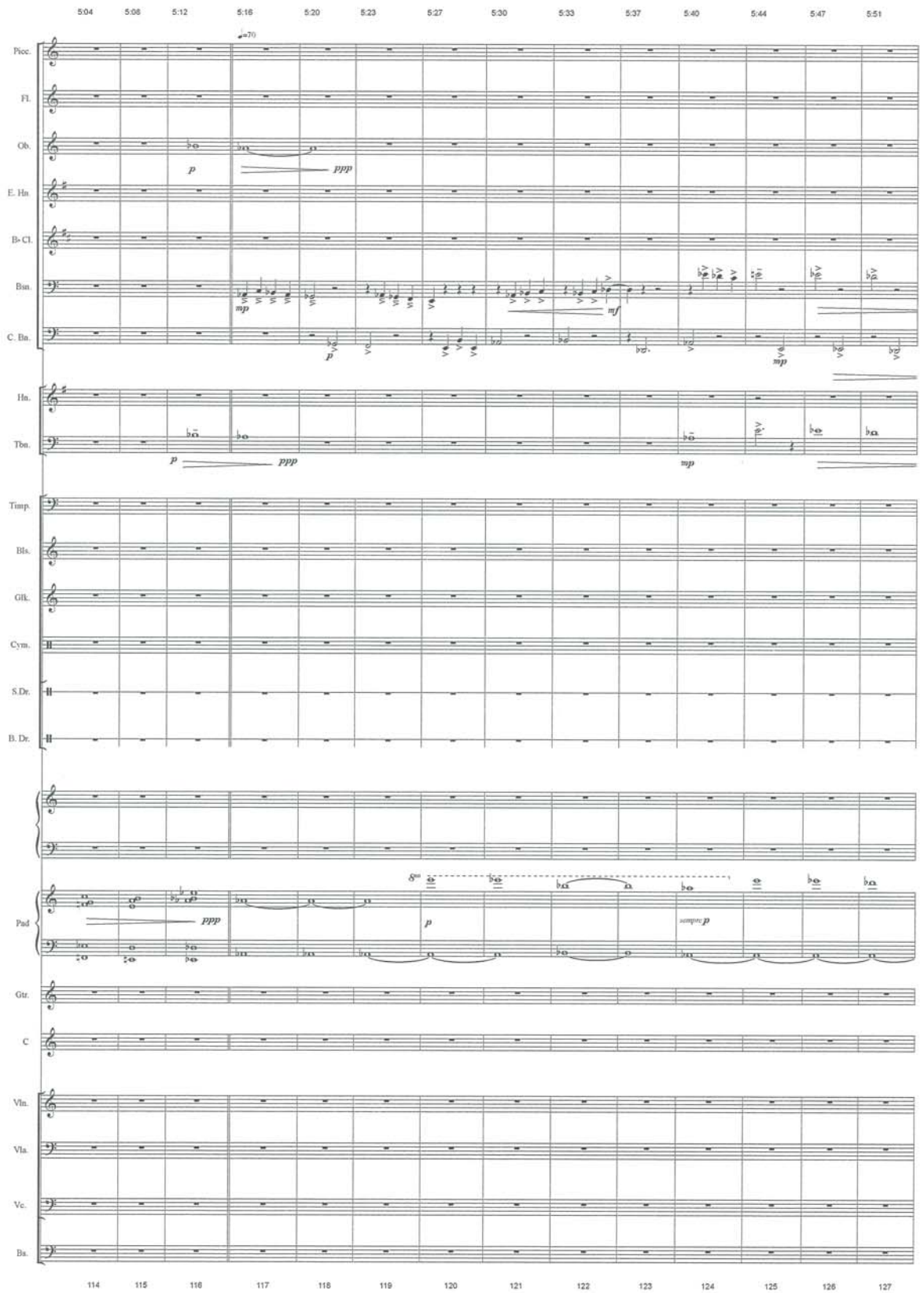
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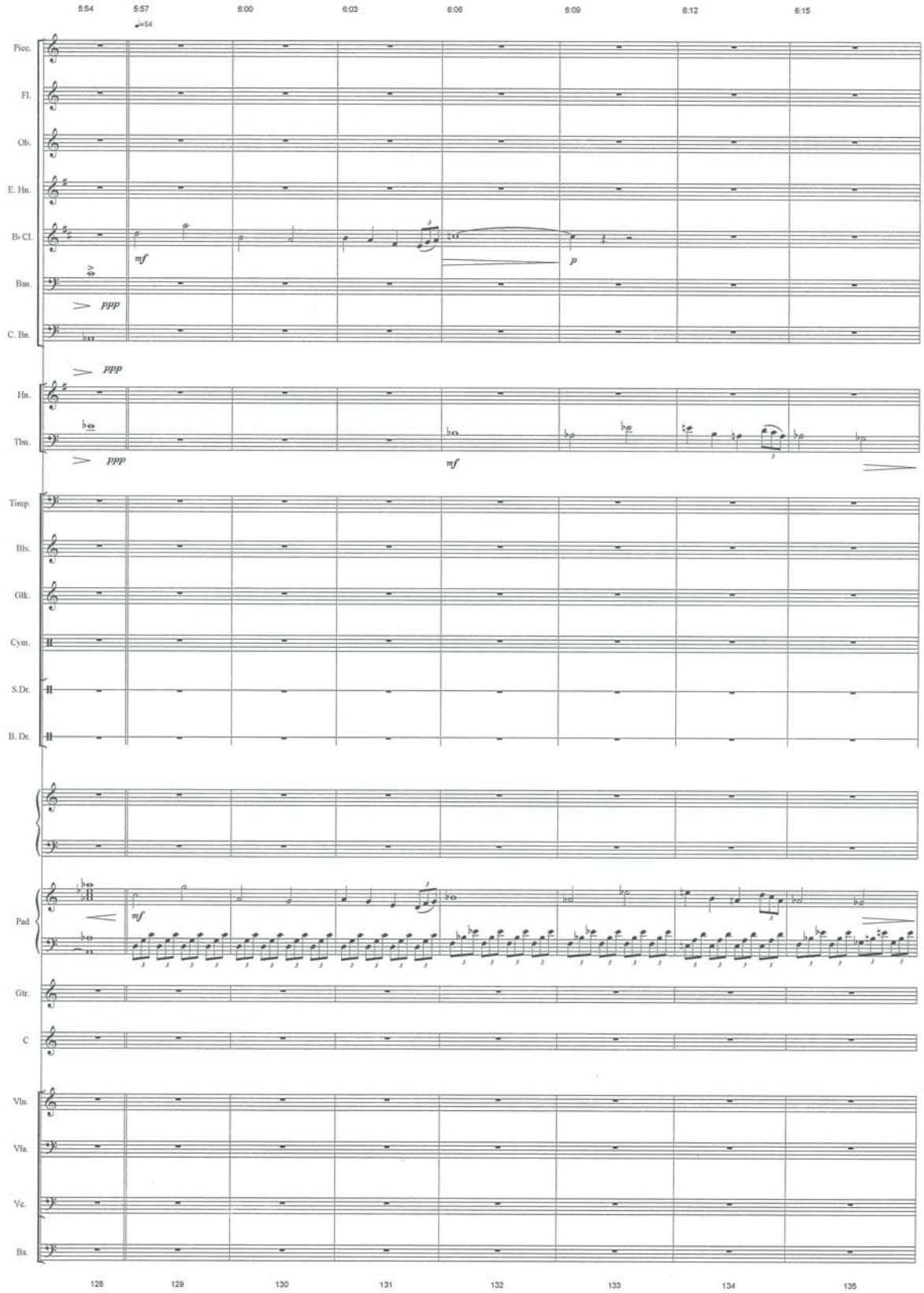
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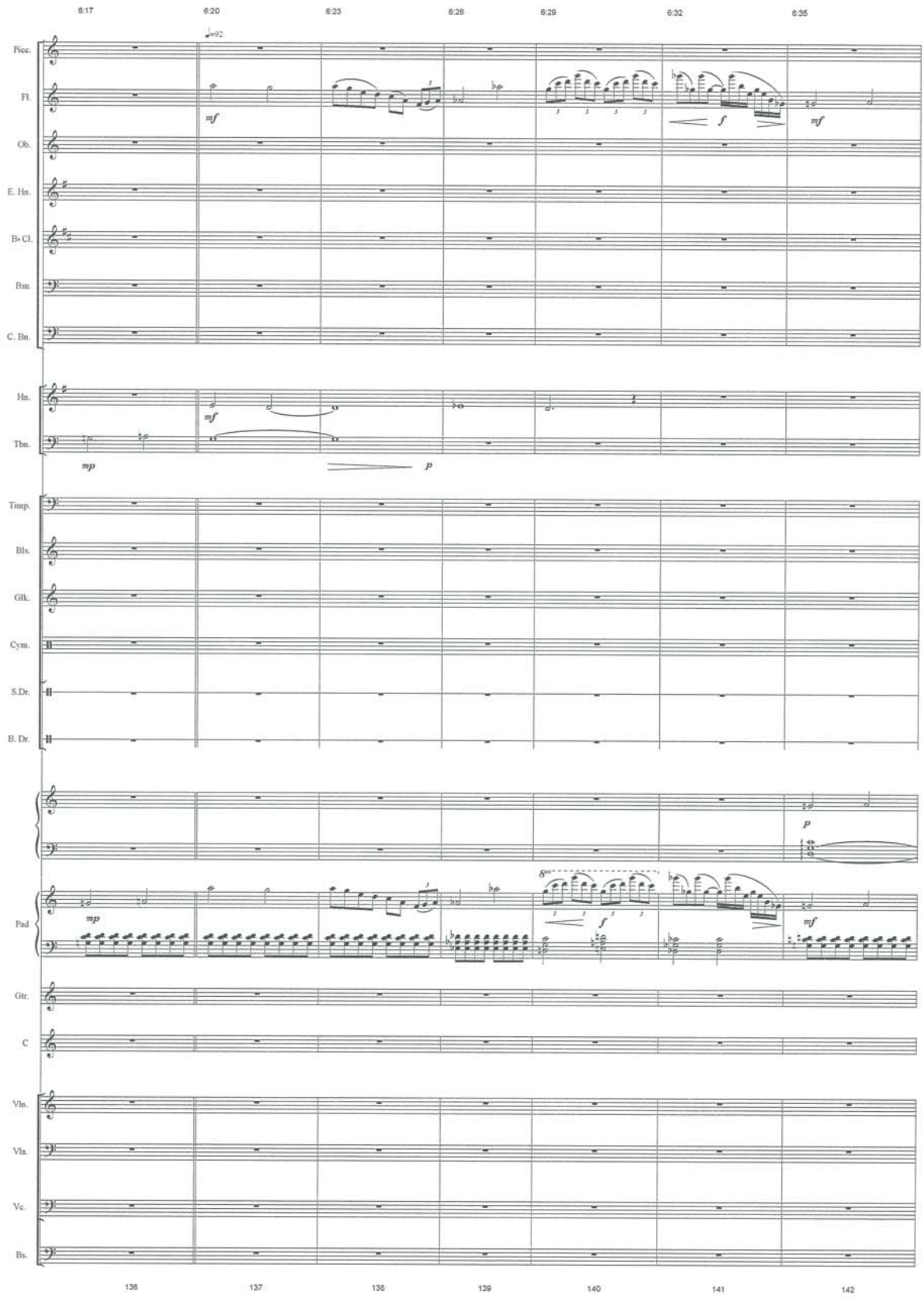
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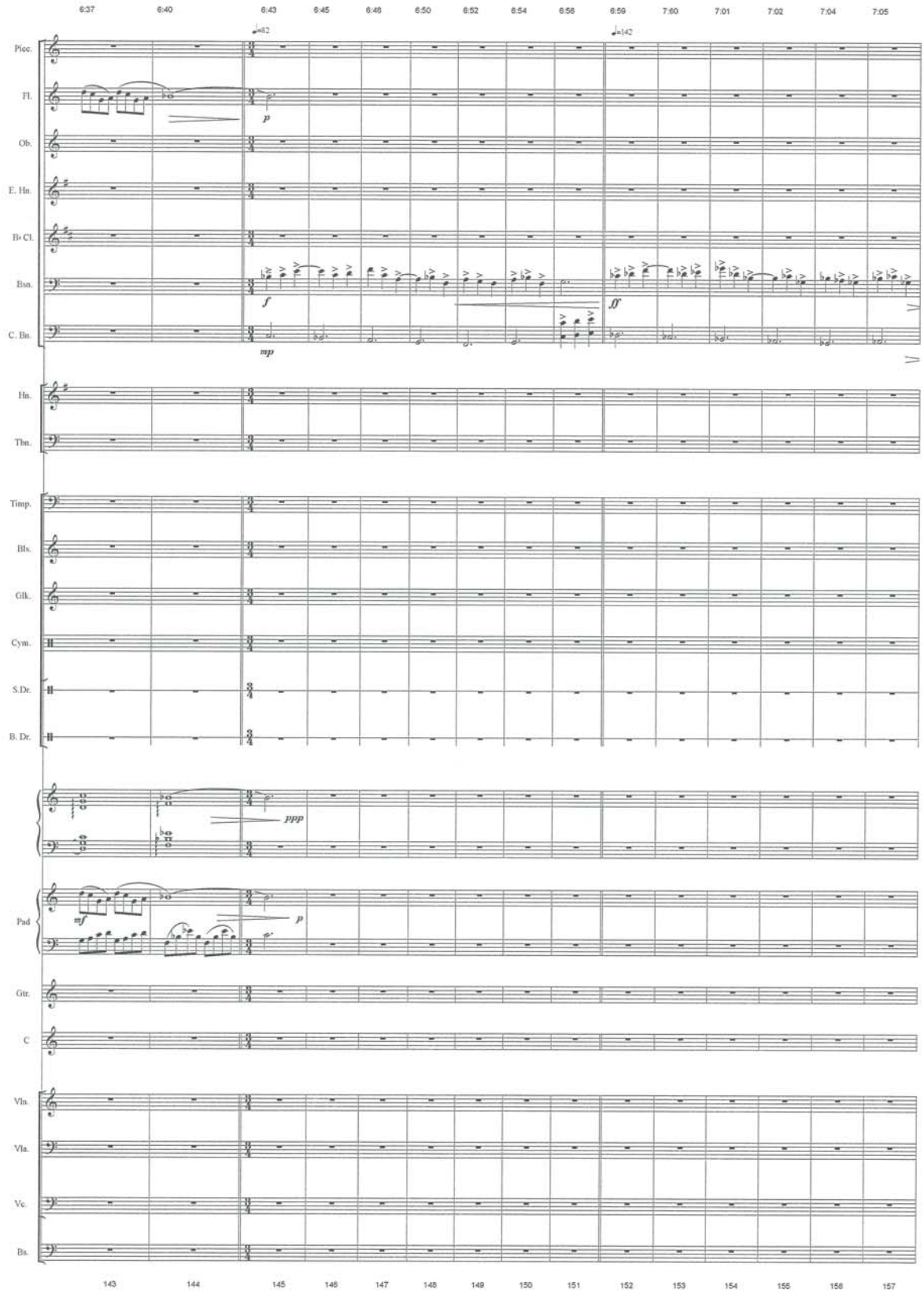
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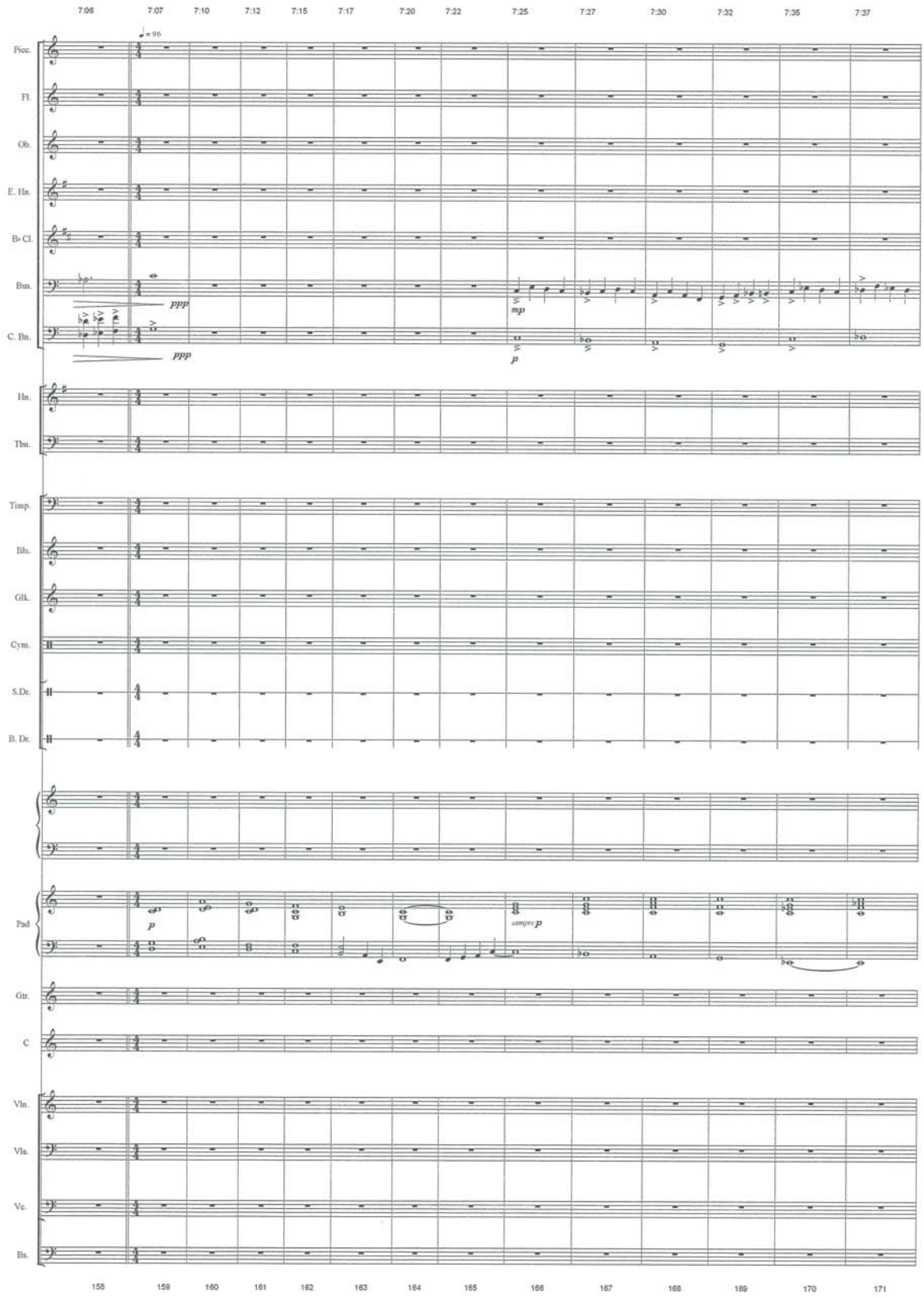
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Ob.
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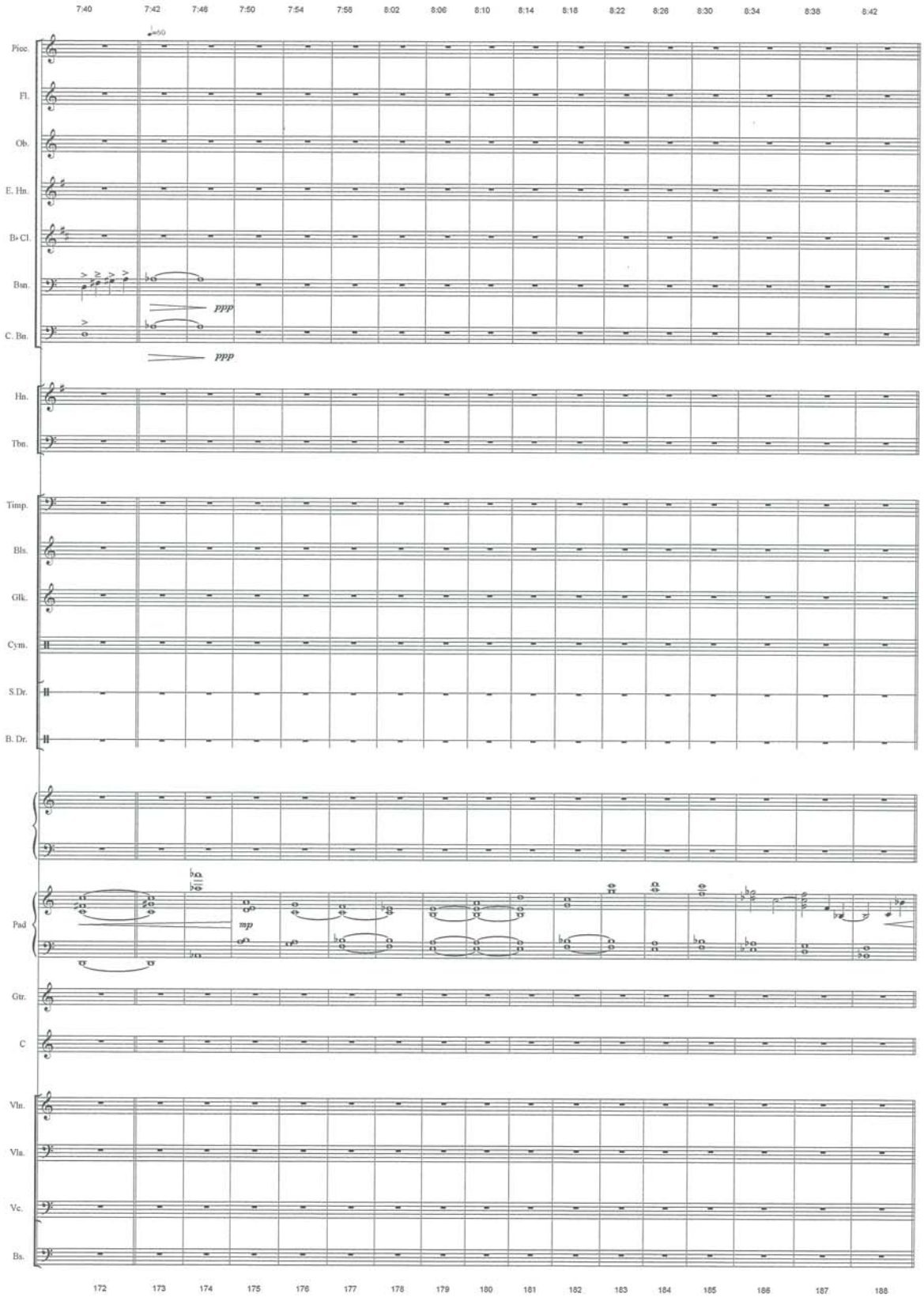
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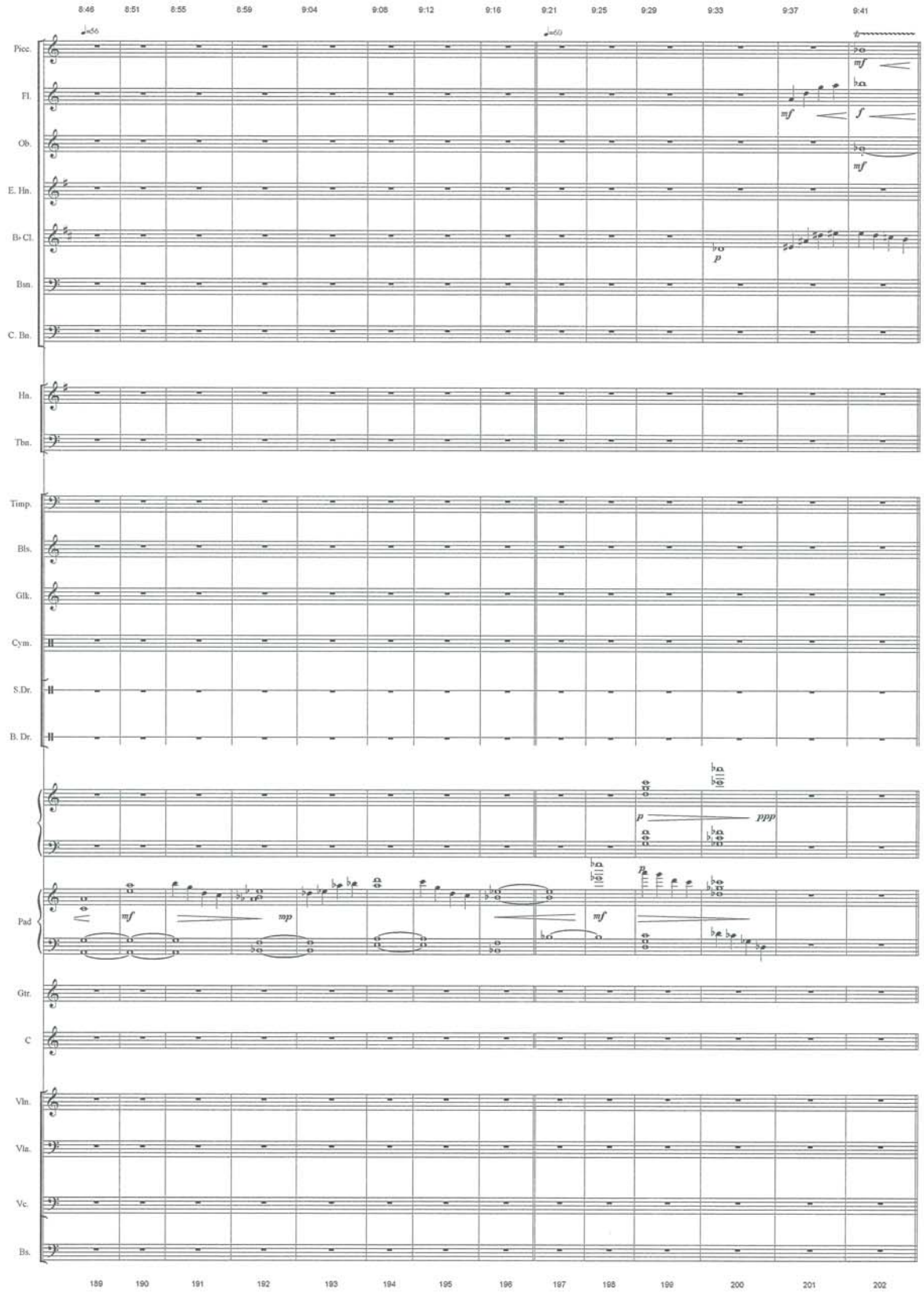
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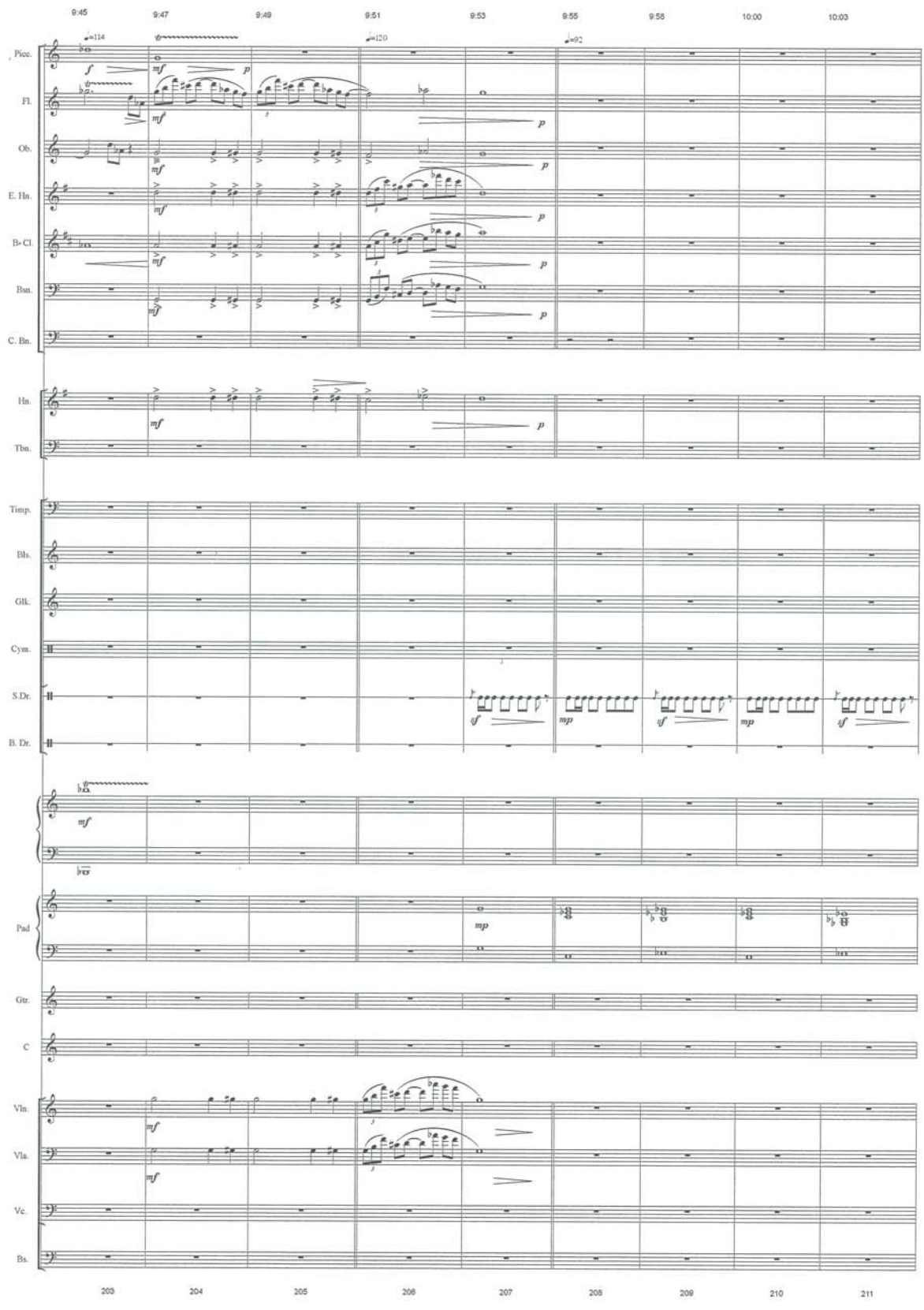
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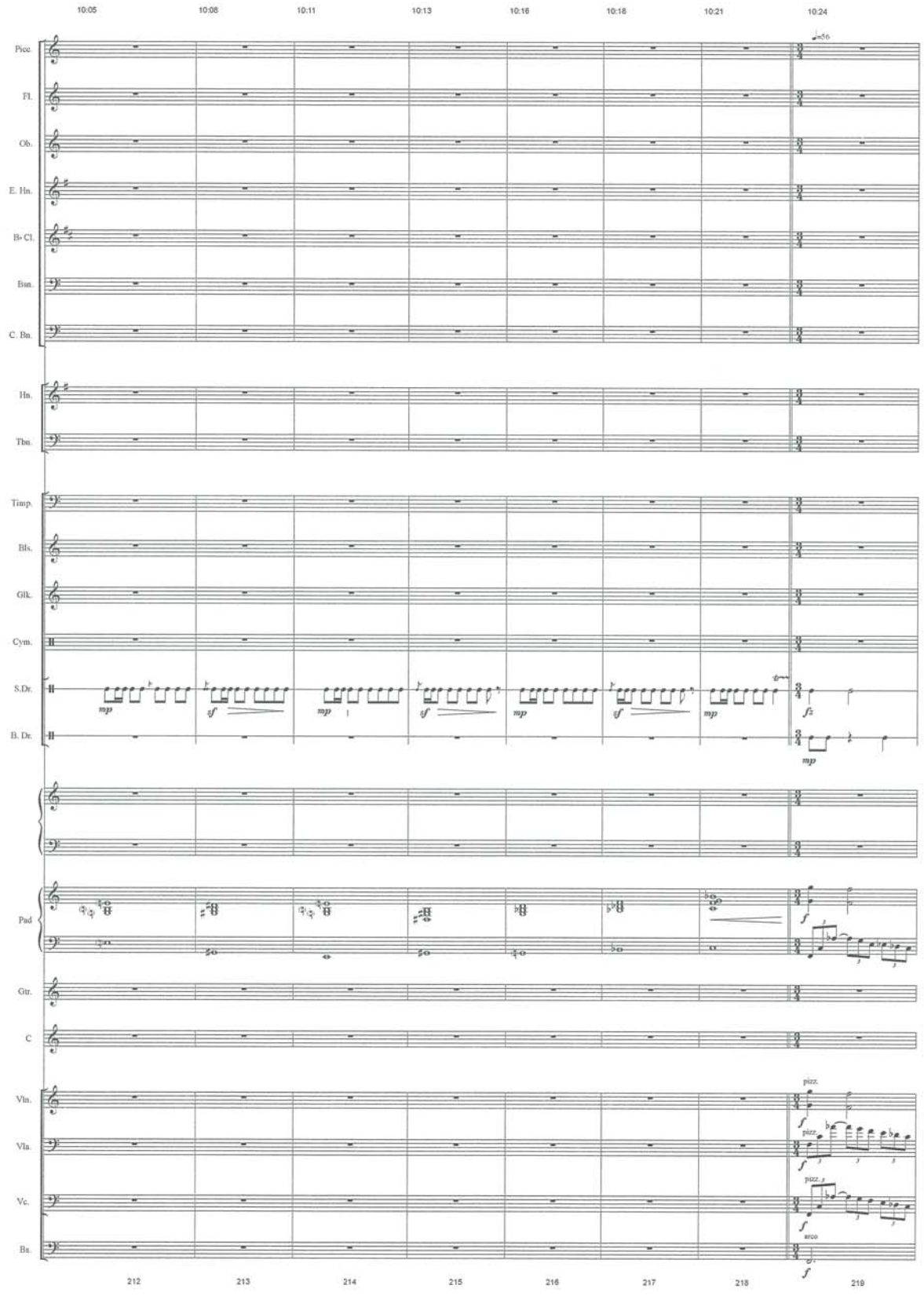
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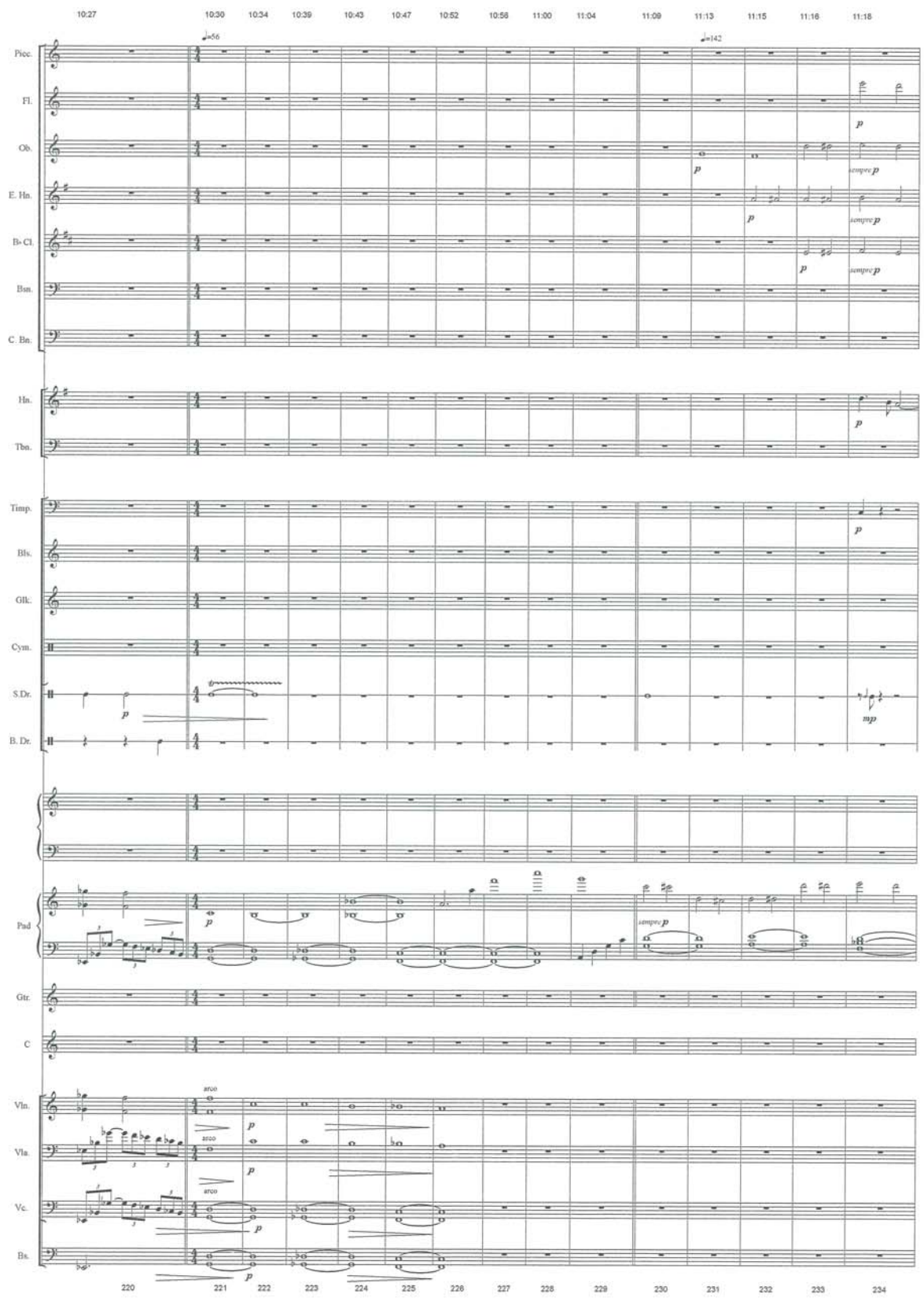
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♩=142
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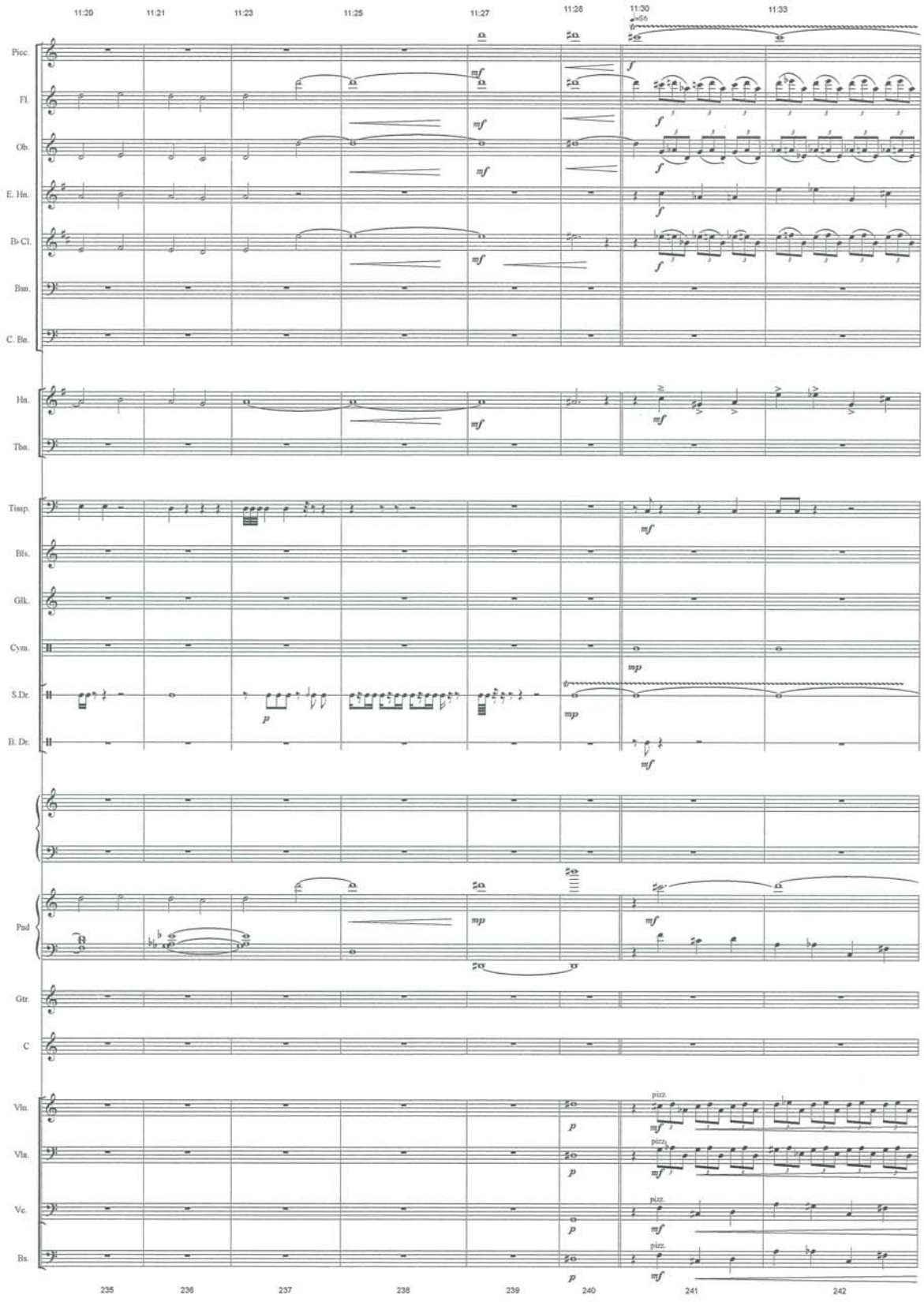
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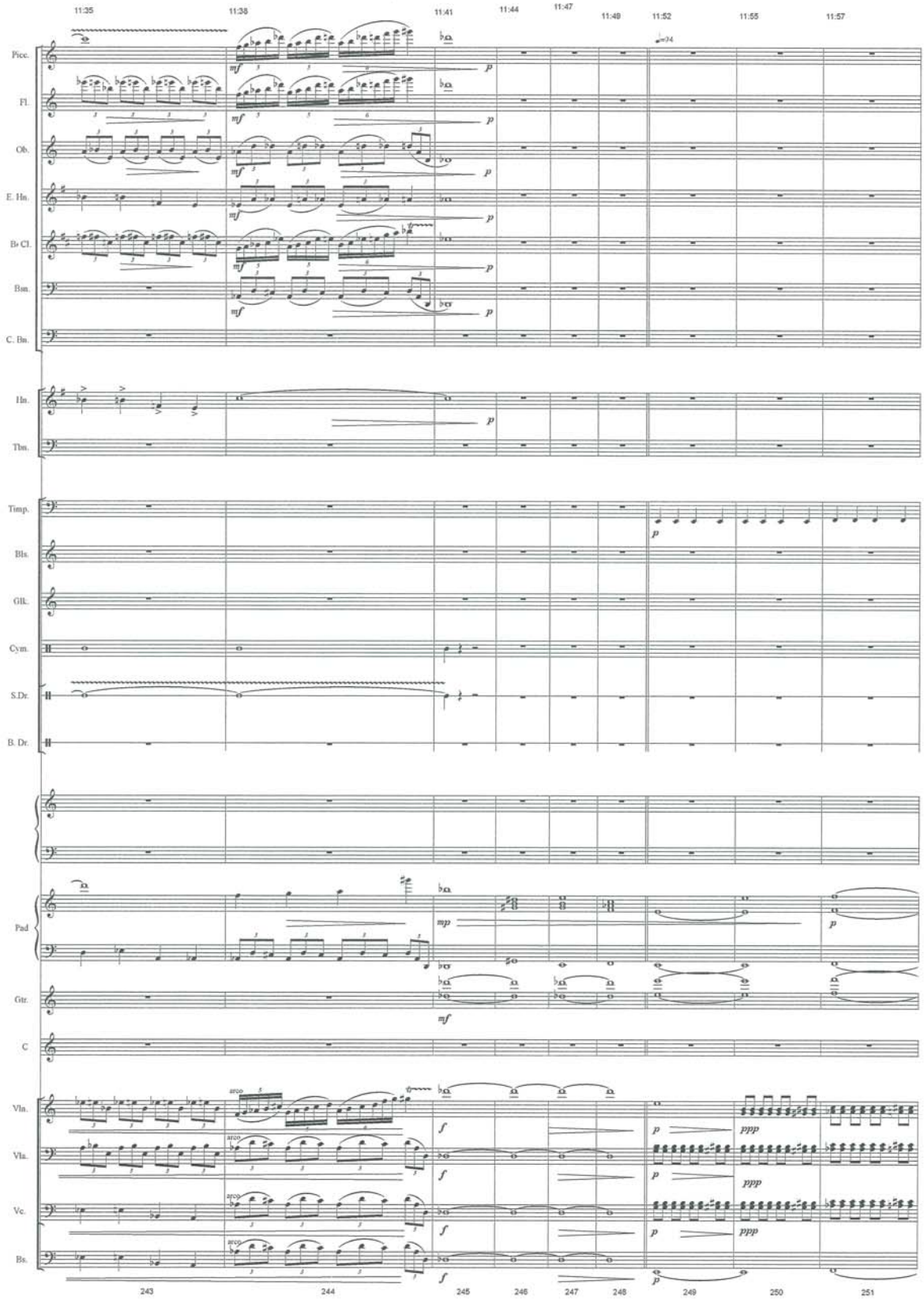
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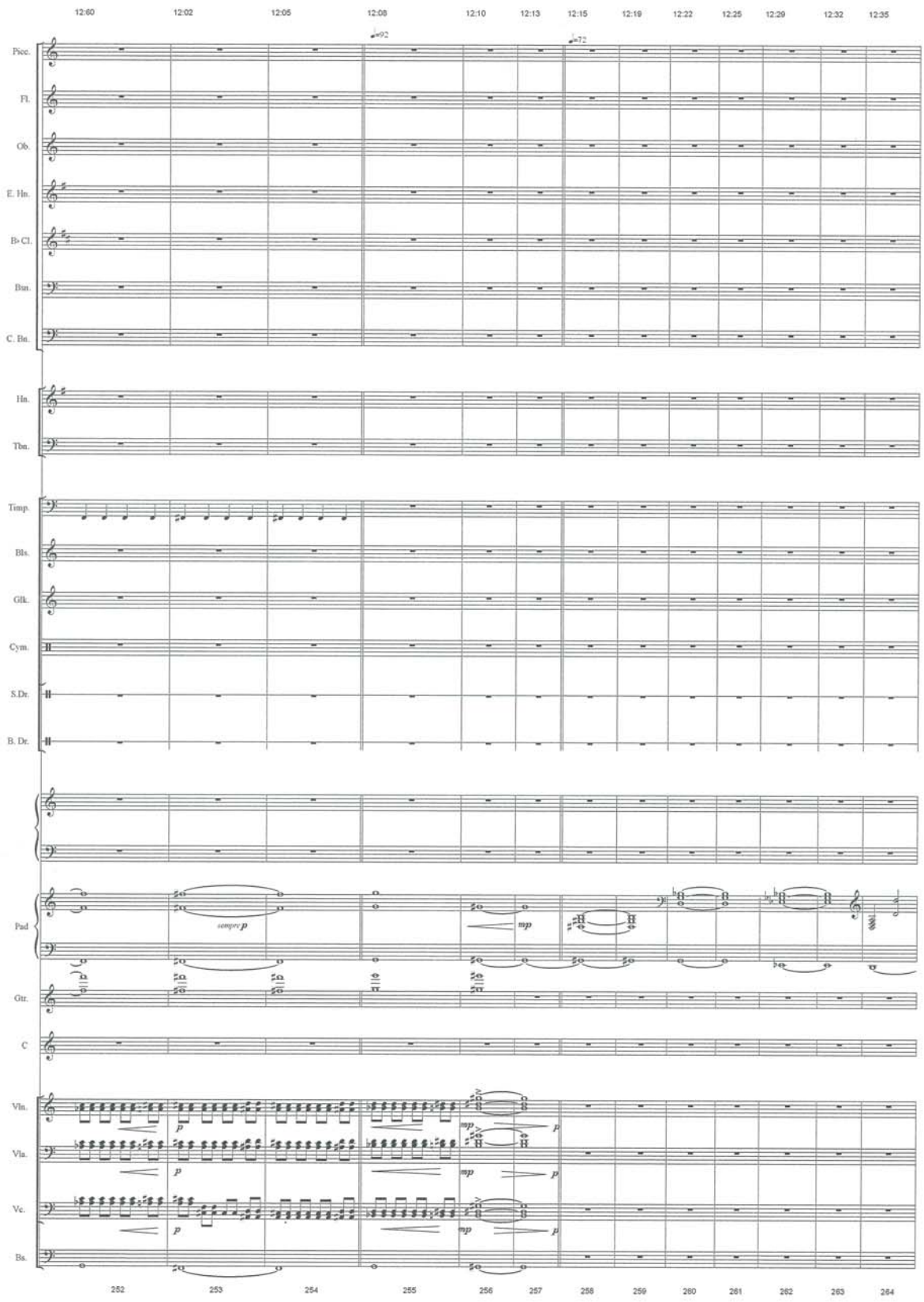
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♩=72
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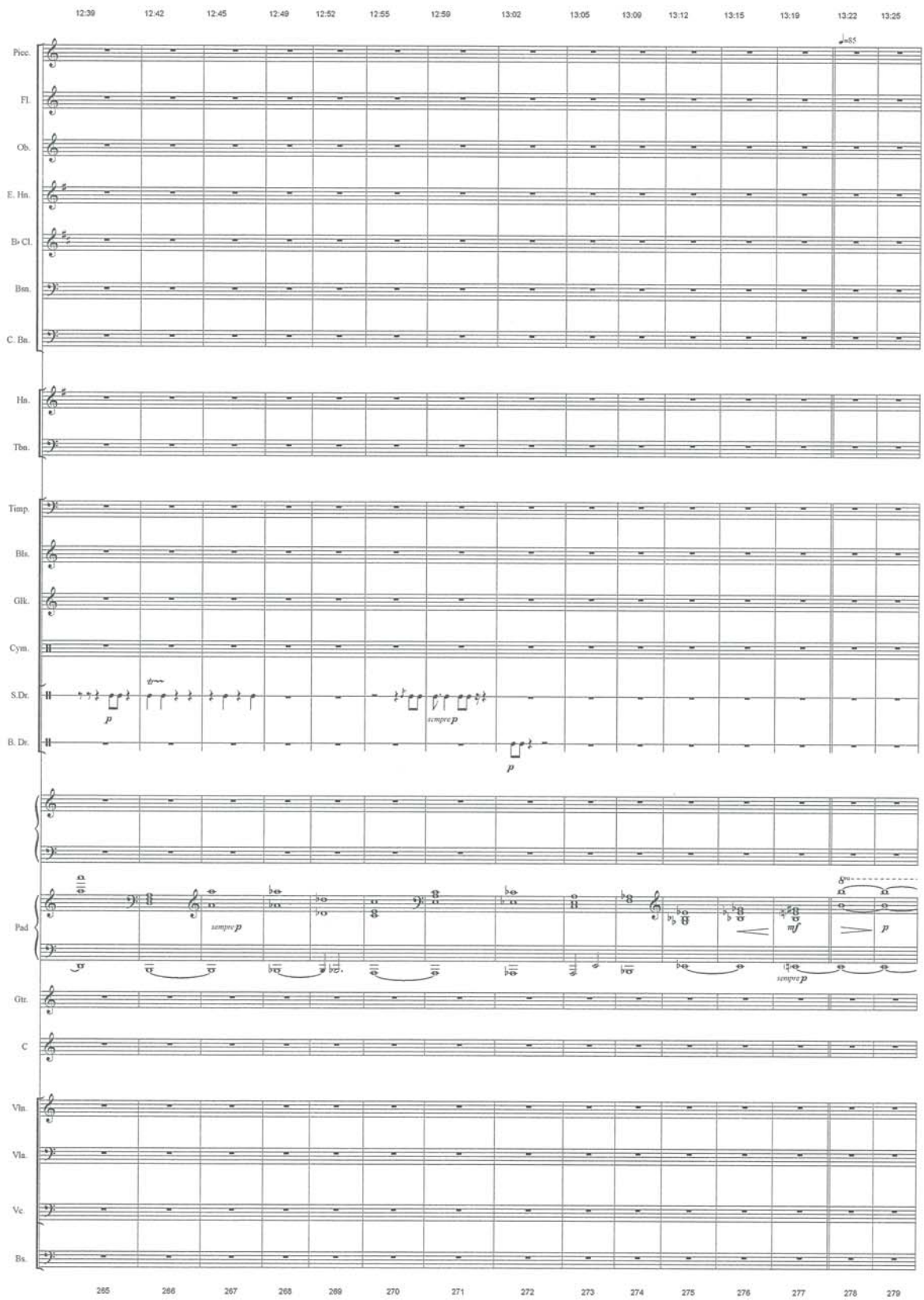
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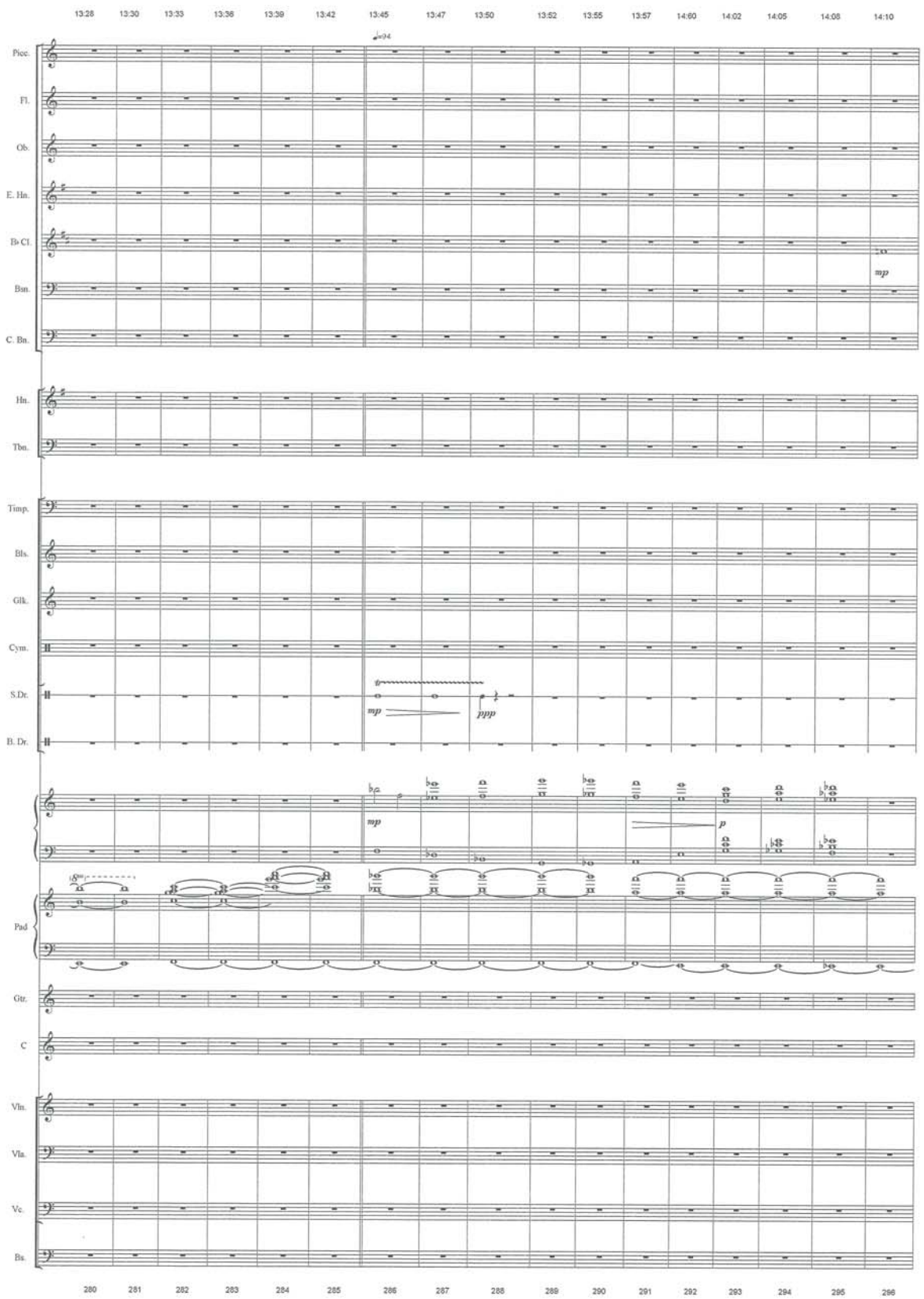
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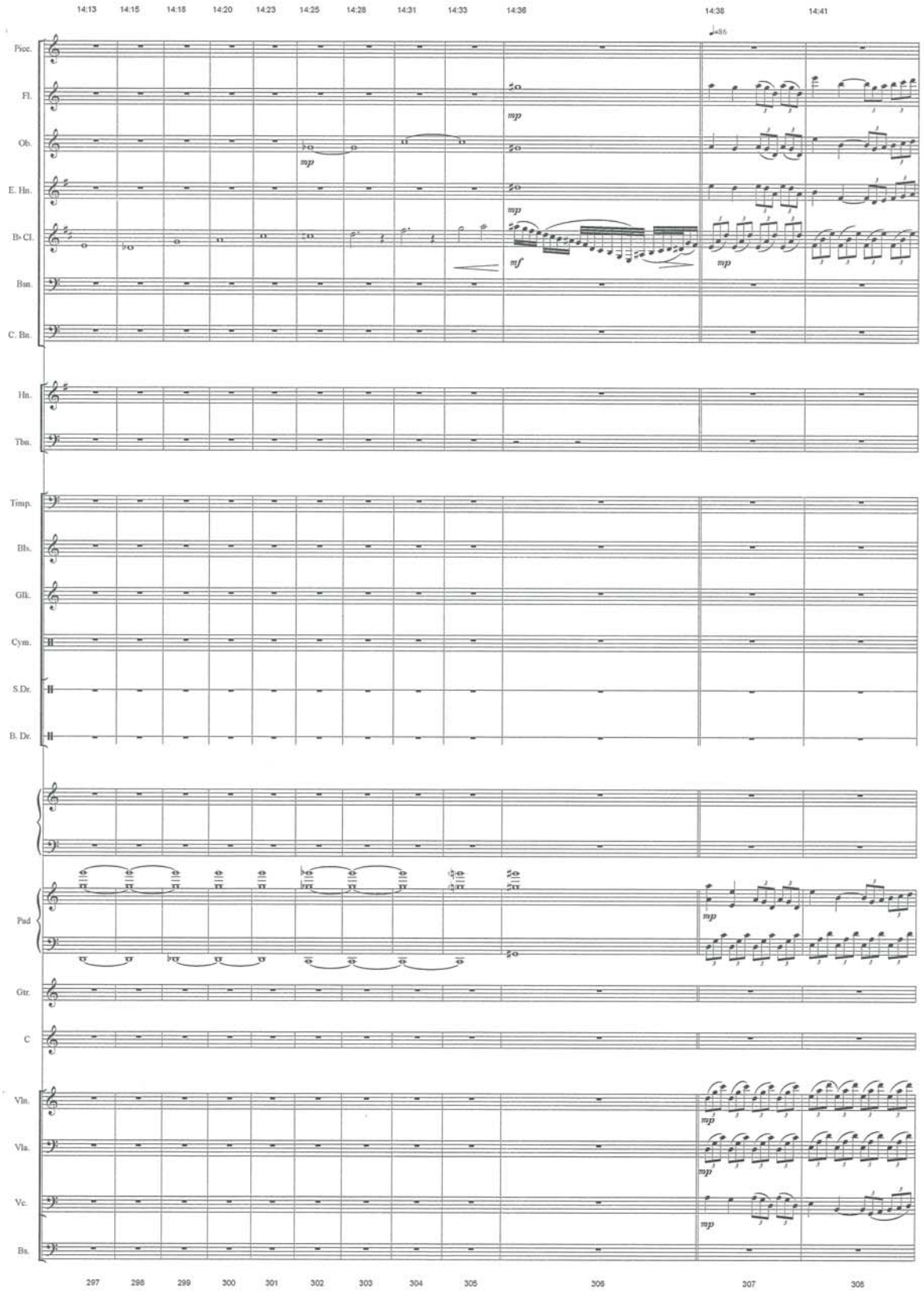
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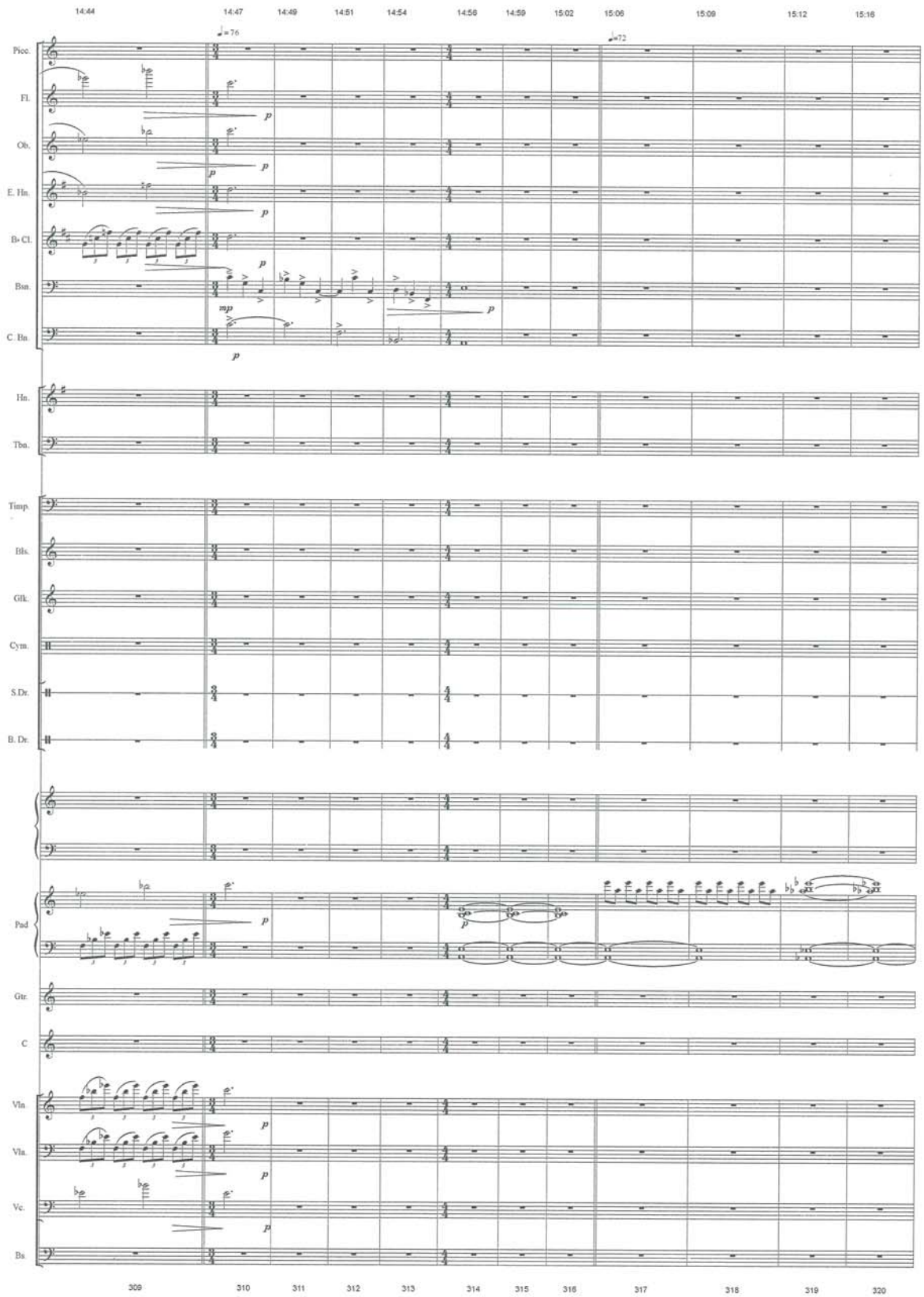
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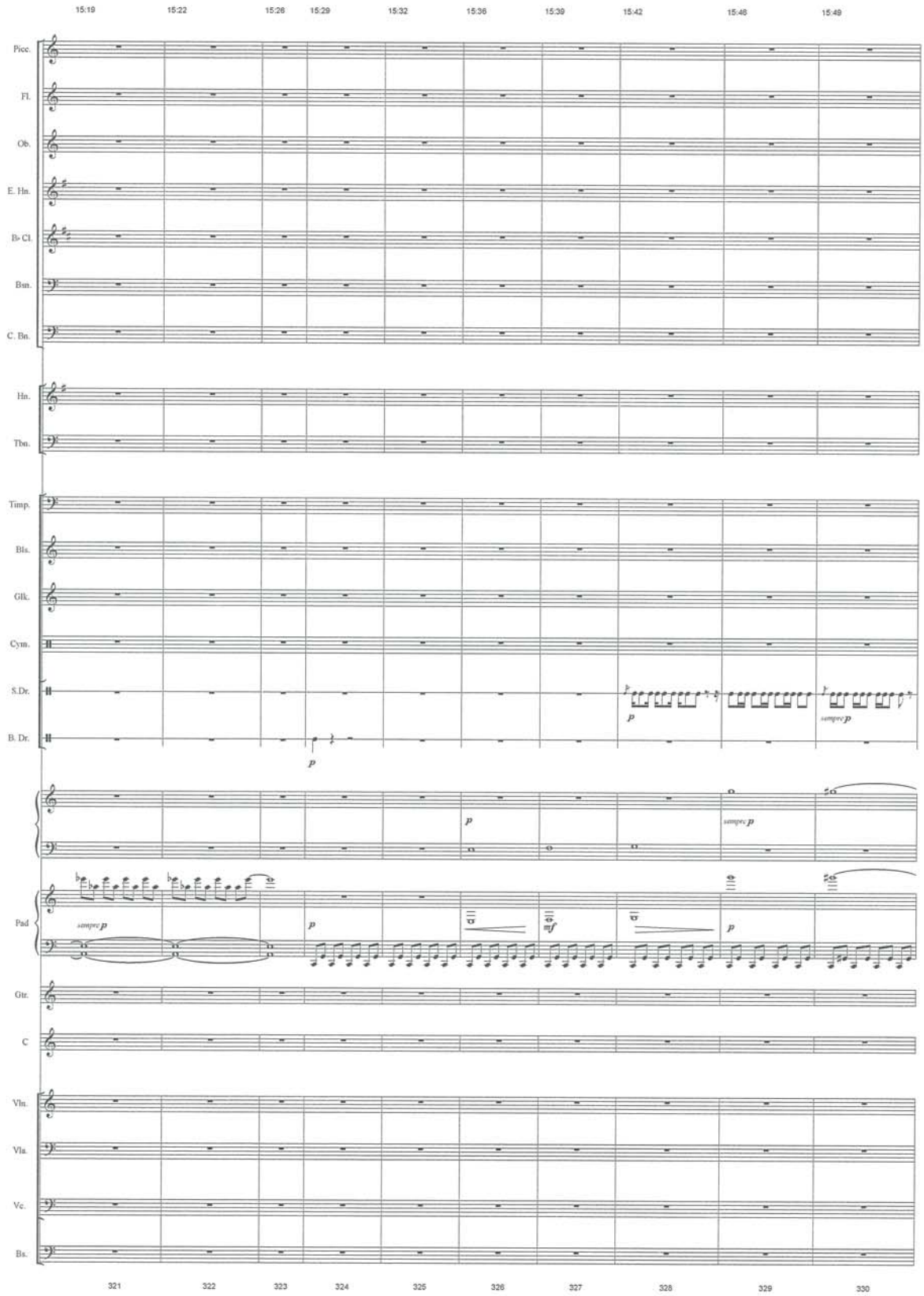
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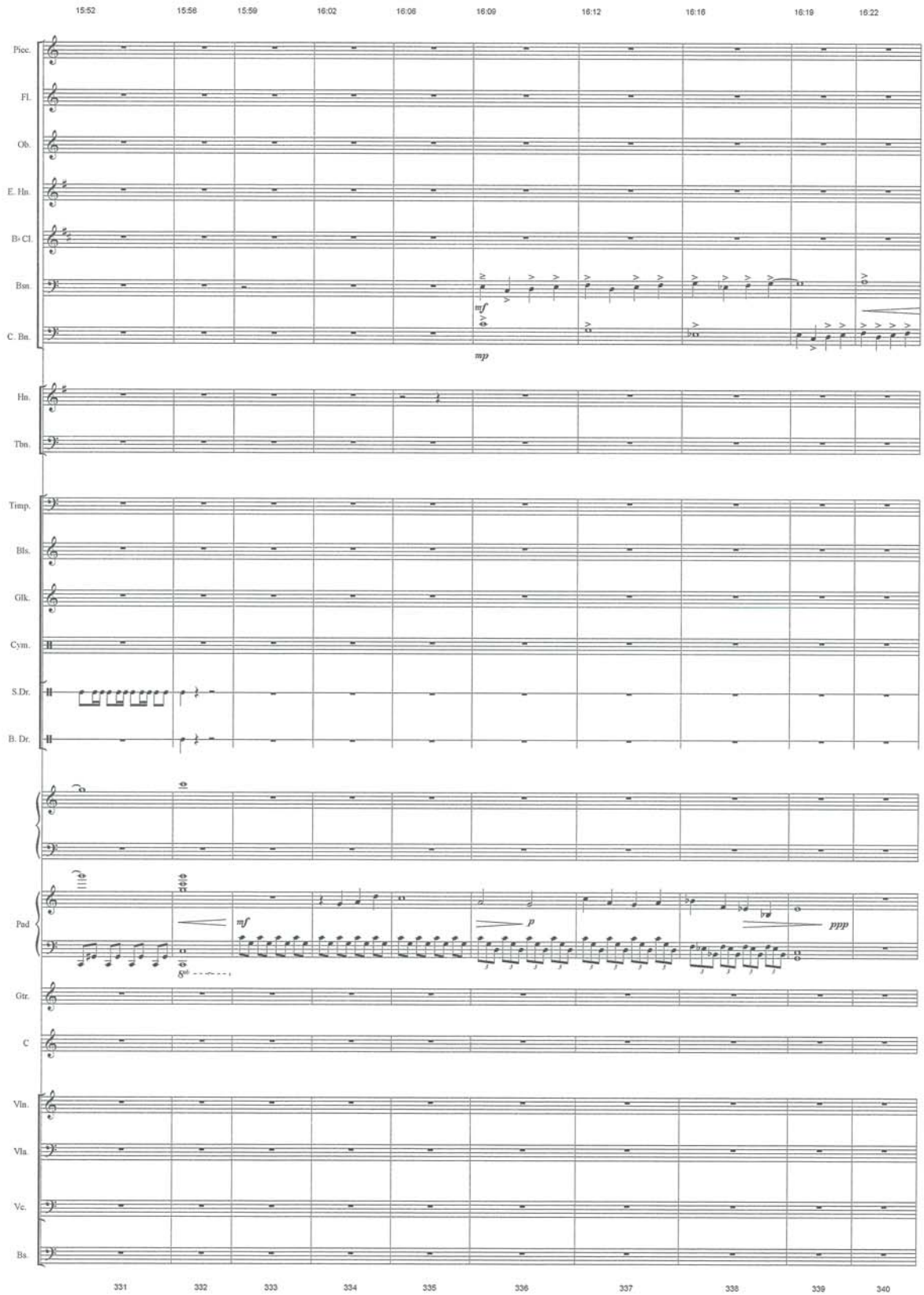
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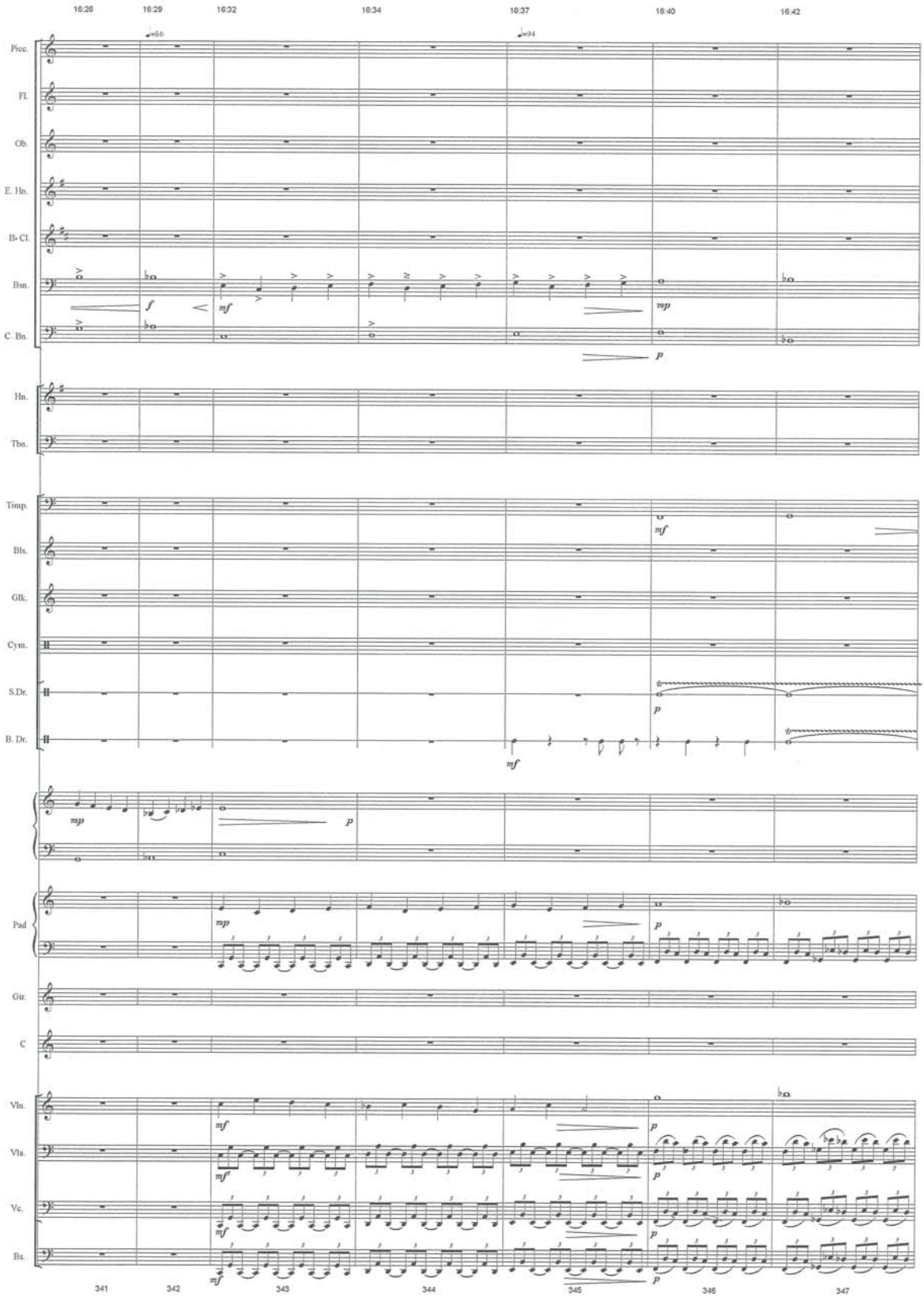
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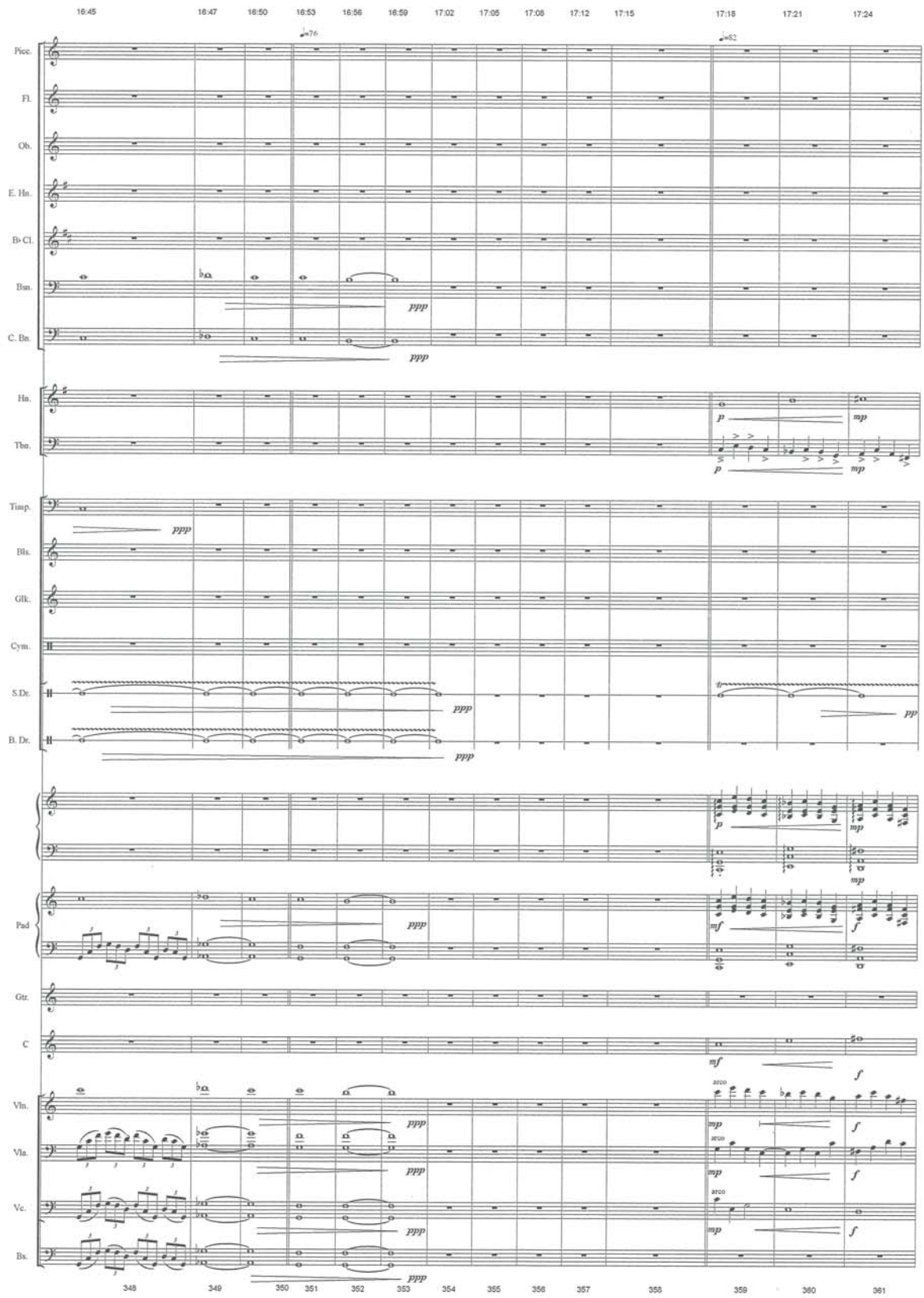
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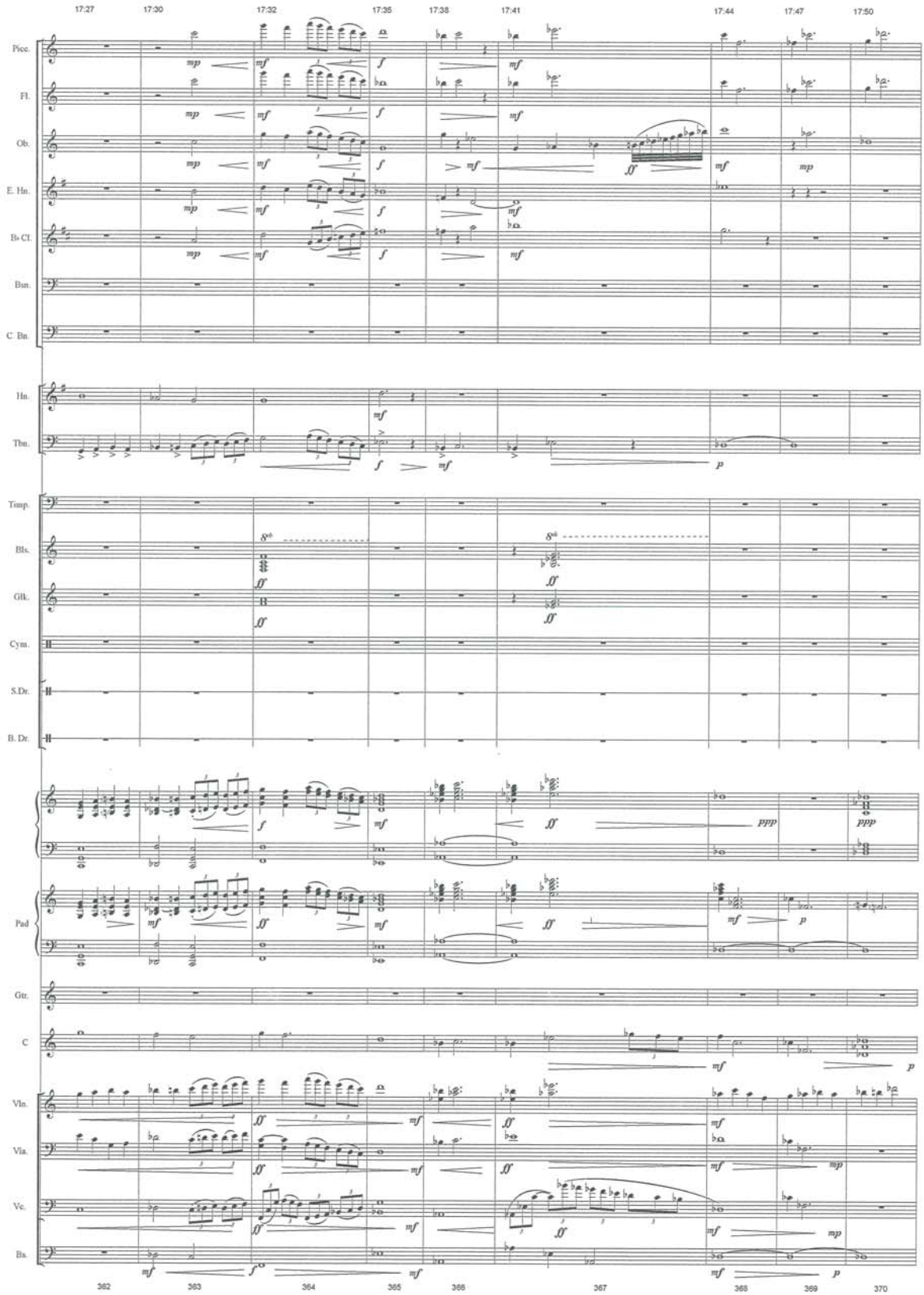
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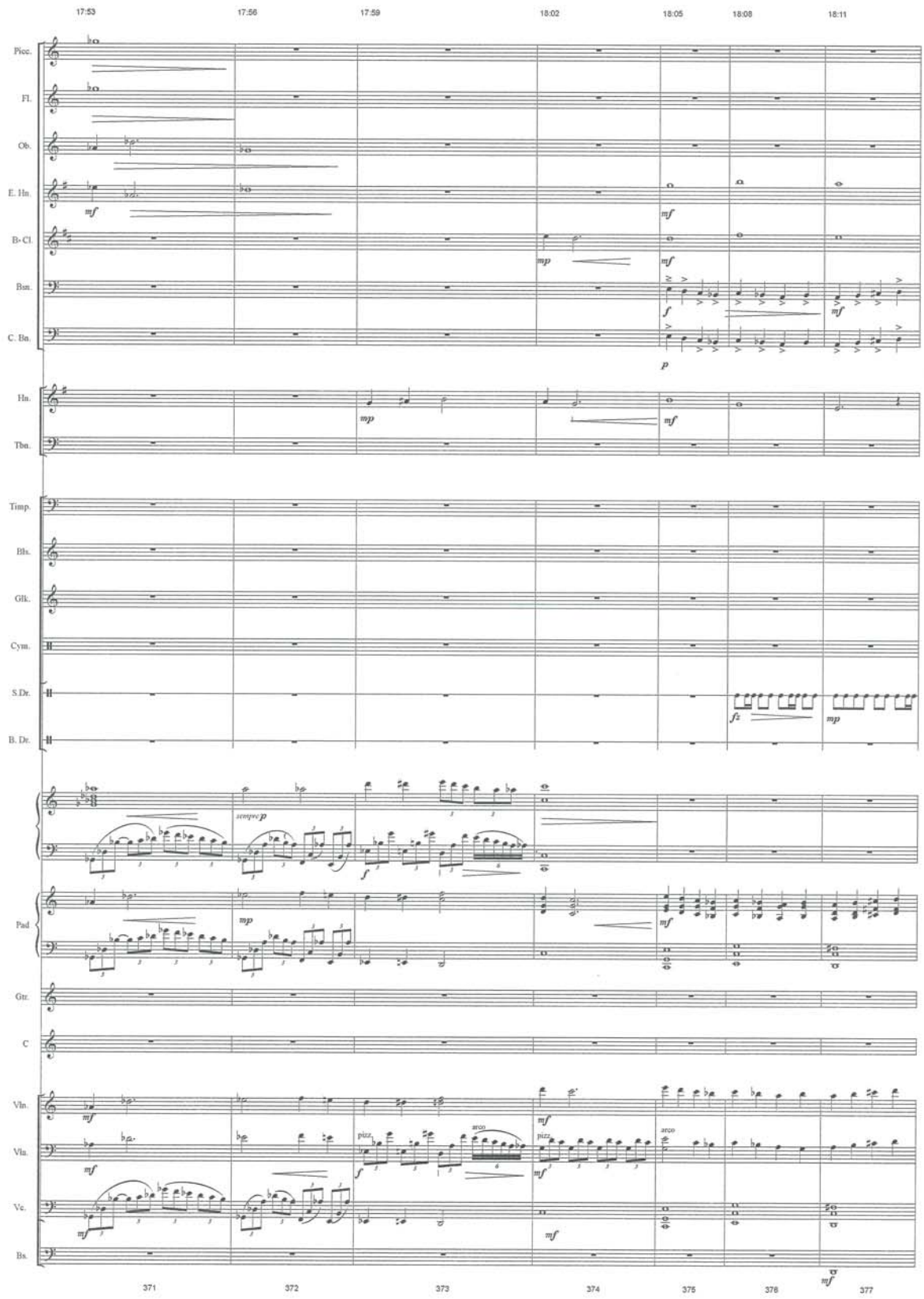
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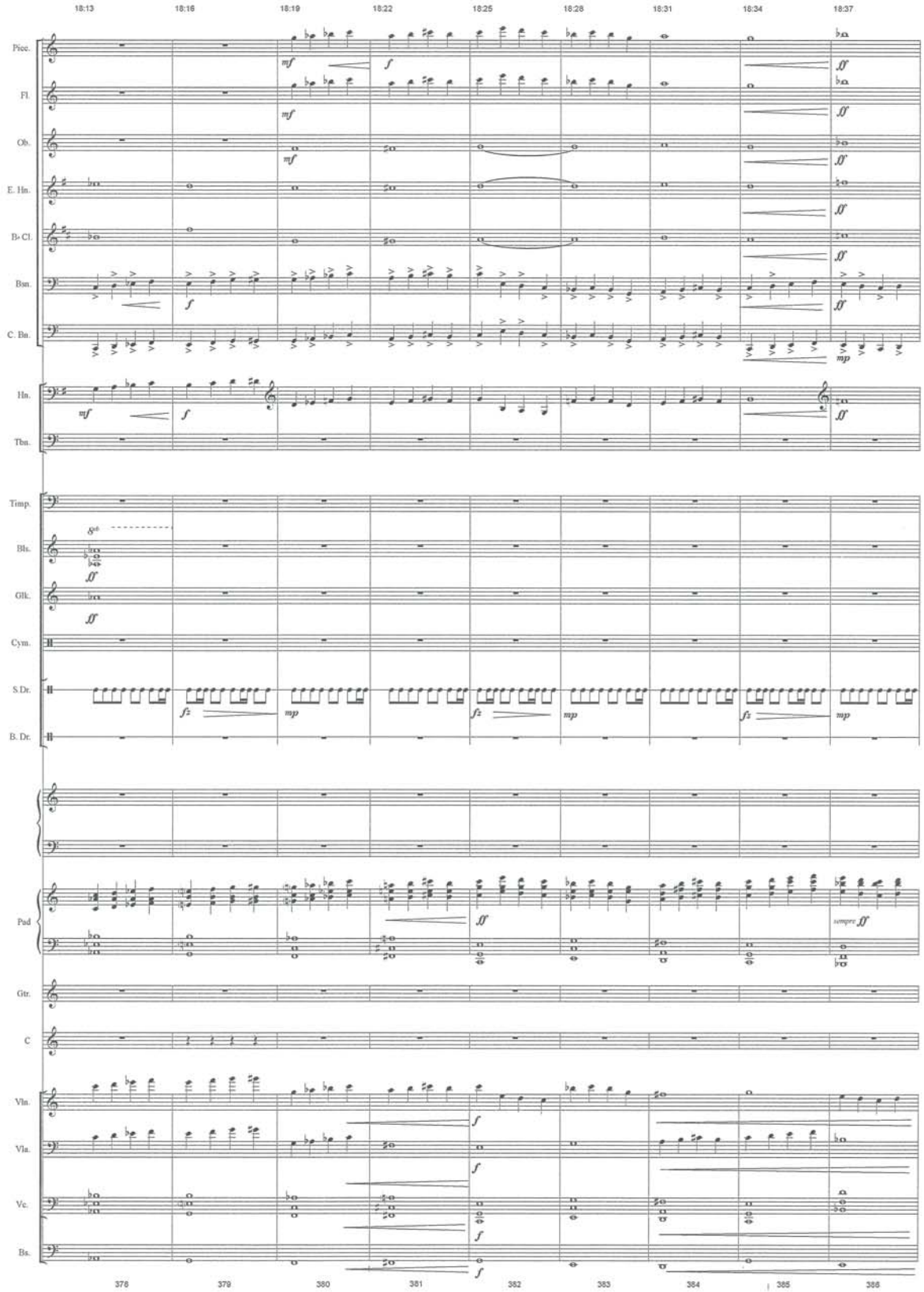
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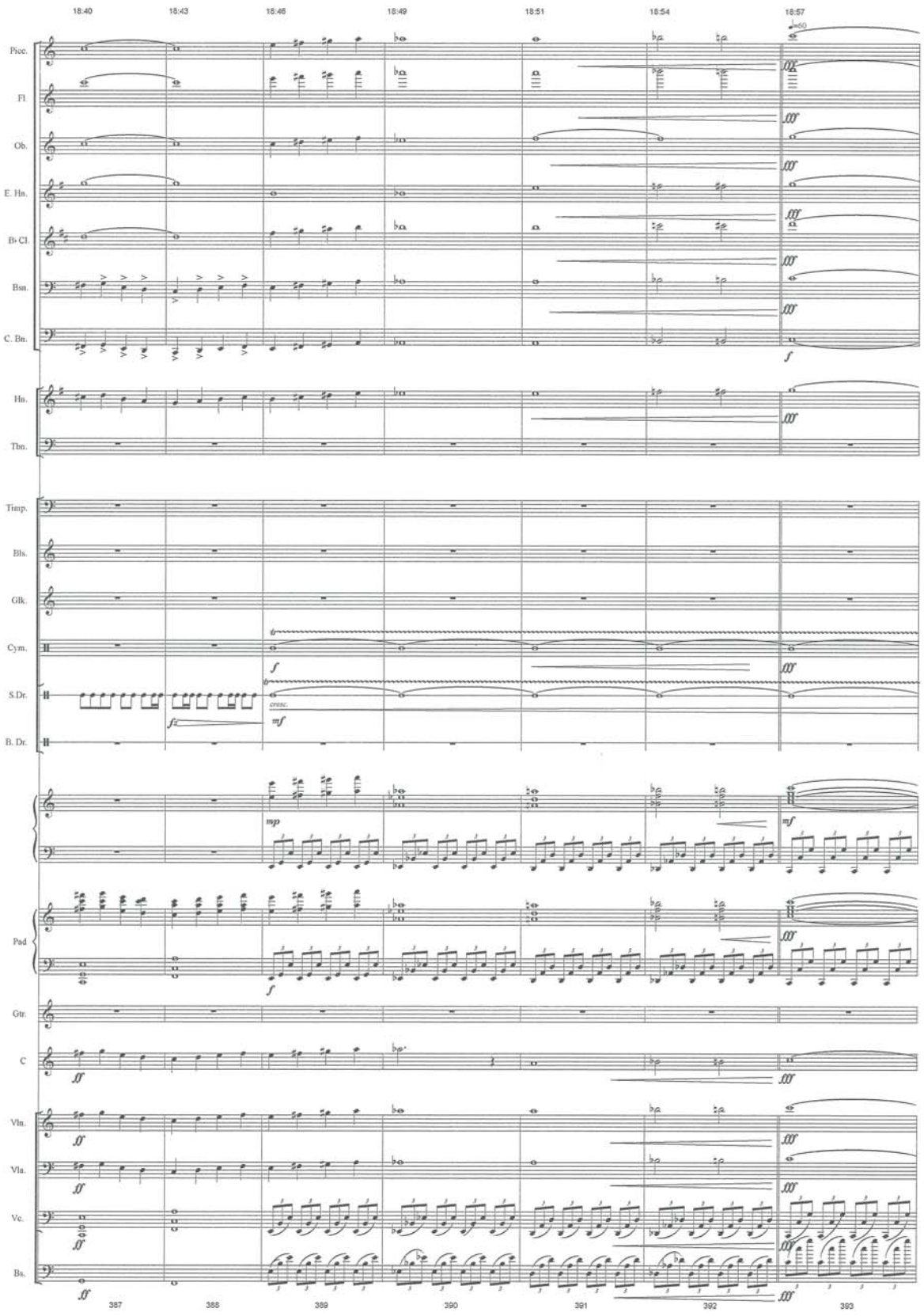
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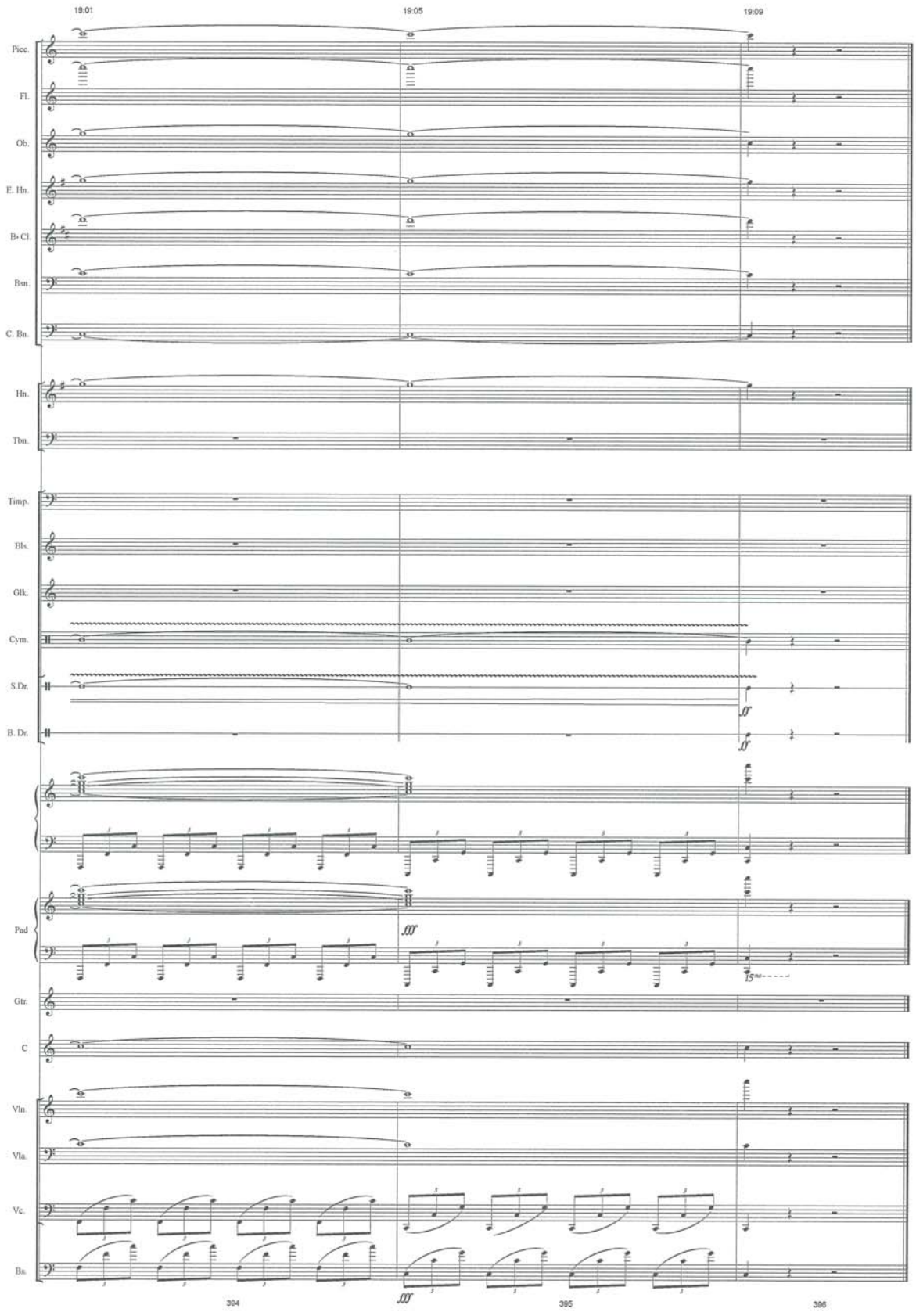
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