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Music 214: Theory & Aural Skills IV
Homework assignments for Unit 2: Post-tonal Analysis

St. Olaf College is a four-year, residential, liberal arts college in Northfield, Minnesota. Students can earn B.M. and/or B.A. degrees in various subtopics within music (e.g., education, performance, theory/composition, etc.), but all music majors take a four-semester sequence of classes in theory and aural skills. The fourth semester is itself broken down into four units, with the first unit covering advanced tonal harmony, a second unit on post-tonal analysis, a third on impressionism and neo-classicism, and a fourth unit that covers the blues and jazz.

The series of homework assignments I am asking you to consider belong to the analytical portion of Unit 2 and progress from basic set-theoretical operations using a given set of numbers, to the goal of the unit, which is to work directly from a score and to draw meaningful observations about actual music. In my experience the early exercises are crucial because they allow students to begin working with sets immediately, while avoiding – for the time being – the thorny issue of segmentation.¹ I'll also draw your attention to the fact that this sequence of homework assignments begins with smaller, unordered sets and then moves to serialism, which seems to be the accepted model within post-tonal textbooks, including those by Straus and Roig-Francolí, and in the chapters on post-tonal analysis in the Marvin/Clendenning text. This unit of the class is designed to last three weeks, and homework assignments are due twice a week, on Mondays and Thursdays, so there is a total of six assignments.

One of the reasons I'm submitting this for inclusion on the JMTP website is that many of the most popular textbooks currently in use don't include post-tonal analysis. At the same time, ours is not the only school in which a fifth semester on post-tonal analysis is not required. This leaves many of us in the position of trying to develop post-tonal teaching materials that are succinct, yet meaningful, and my hope is that these homework assignment might serve just that need.

What I have submitted is a single PDF that includes this cover page, 7 assignments, and the keys to those 7 assignments. As you scroll through the file it should be pretty straightforward until you get to assignment 9, for which there are two versions, each with its own key. However, since both versions ask students to fill in a matrix and to determine the rows for mm. 1–11 of the same piece, I only included one matrix and one score, which are to go with both versions of the assignment.

¹ See Christopher Hasty, "Segmentation and Process in Post-Tonal Music," *Music Theory Spectrum*, Vol. 3. (Spring, 1981), pp. 54-73.

Music 214: Theory IV
Assignment No. 5

Name : _____

For each of the following sets find its normal order and perform the indicated operation on it. NB! Both operations should be performed on the normal order.



normal
order

 T_3

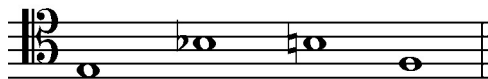
 T_4I



normal
order

 T_8

 T_2I



normal
order

 T_E

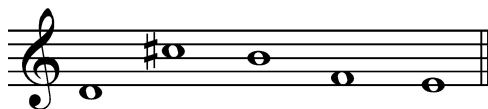
 T_1I



normal
order

 T_6

 T_7I



normal
order

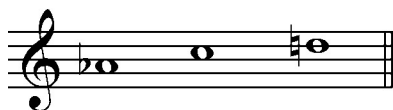
 T_2

 T_EI

Music 214: Theory IV
Assignment No. 5

key

For each of the following sets find its normal order and perform the indicated operation on it. NB! Both operations should be performed on the normal order.



802
normal
order

E35
T₃

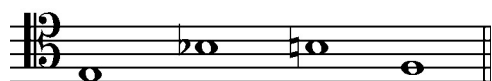
248
T₄I



T12
normal
order

69T
T₈

014
T₂I



45TE
normal
order

349T
T_E

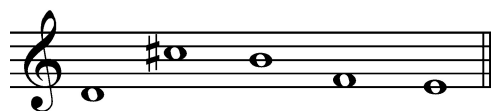
2389
T₁I



689E
normal
order

0235
T₆

8TE1
T₇I



E1245
normal
order

13467
T₂

679T0
T_EI

Music 214: Theory IV

Name: _____

Assignment No. 6

due 8 March 2010

For each of the following sets, find the normal order, prime form, set class, and requested transformations. (Base the transformations on the normal order.)

1. (15T)	_____	_____	_____	_____	_____
	NO	PF	SC	T ₄	T ₇ I

2. (549)	_____	_____	_____	_____	_____
	NO	PF	SC	T ₅	T ₈ I

3. (52E3)	_____	_____	_____	_____	_____
	NO	PF	SC	T ₇	T _T I

4. (213E)	_____	_____	_____	_____	_____
	NO	PF	SC	T ₉	T ₀ I

5. (2965)	_____	_____	_____	_____	_____
	NO	PF	SC	T _E	T ₂ I

6. (4167)	_____	_____	_____	_____	_____
	NO	PF	SC	T ₁	T ₃ I

7. (T3817)	_____	_____	_____	_____	_____
	NO	PF	SC	T ₂	T ₄ I

8. (43105)	_____	_____	_____	_____	_____
	NO	PF	SC	T ₃	T ₅ I

9. (E7041) _____
 NO PF SC T₄ T₆I

10. (473509) _____
 NO PF SC T₅ T₇I

11. List the interval vector for the sets given in questions 1, 4, 6, 8, and 10.

In the blank between each pair of sets indicate the exact nature of their equivalence (by T_n or T_nI). Leave it blank if they are not equivalent.

12. (439) _____ (187)

13. (9E4) _____ (53T)

14. (9T48) _____ (4605)

15. (8362) _____ (03T5)

16. (8T75E) _____ (64973)

Music 214: Theory IV
Assignment No. 6

Name: *key*

For each of the following sets, find the normal order, prime form, set class, and requested transformations. (Base the transformations on the normal order.)

1. (15T)	<u>T15</u> NO	<u>037</u> PF	<u>3-11</u> SC	<u>259</u> T ₄	<u>269</u> T ₇ I
2. (549)	<u>459</u> NO	<u>015</u> PF	<u>3-4</u> SC	<u>9T2</u> T ₅	<u>E34</u> T ₈ I
3. (52E3)	<u>E235</u> NO	<u>0236</u> PF	<u>4-12</u> SC	<u>69T0</u> T ₇	<u>578E</u> T _T I
4. (213E)	<u>E123</u> NO	<u>0124</u> PF	<u>4-2</u> SC	<u>8TE0</u> T ₉	<u>9TE1</u> T ₀ I
5. (2965)	<u>2569</u> NO	<u>0347</u> PF	<u>4-17</u> SC	<u>1458</u> T _E	<u>5890</u> T ₂ I
6. (4167)	<u>(1467)</u> NO	<u>(0136)</u> PF	<u>4-13</u> SC	<u>(2578)</u> T ₁	<u>(89E2)</u> T ₃ I
7. (T3817)	<u>(78T13)</u> NO	<u>(01368)</u> PF	<u>5-29</u> SC	<u>(9T035)</u> T ₂	<u>(13689)</u> T ₄ I
8. (43105)	<u>(01345)</u> NO	<u>(01245)</u> PF	<u>5-3</u> SC	<u>(34678)</u> T ₃	<u>(01245)</u> T ₅ I

9. (E7041) $\frac{(E0147)}{NO}$ $\frac{(01258)}{PF}$ $\frac{5-Z38}{SC}$ $\frac{(3458E)}{T_4}$ $\frac{(E2567)}{T_6I}$

10. (473509) $\frac{(345790)}{NO}$ $\frac{(012469)}{PF}$ $\frac{6-Z46}{SC}$ $\frac{(89T025)}{T_5}$ $\frac{(T02347)}{T_7I}$

11. List the interval vector for nos. 1, 4, 6, 8, and 10.

- 1. [001110]
- 4. [221100]
- 6. [112011]
- 8. [322210]
- 10. [233331]

In the blank between each pair of sets indicate the exact nature of their equivalence (by T_n or T_nI). Leave it blank if they are not equivalent.

12. (439) T_4 (187)

13. (9E4) T_6 (53T)

14. (9T48) T_8 (4605)

15. (8362) *not equivalent* (03T5)

16. (8T75E) T_2I (64973)

Music 214: Theory IV
Assignment No. 7

Name: _____

Bartók, “Bulgarian Rhythm,” No. 115 from *Mikrokosmos*

1. Analyze the pentachords that are presented in the right hand.

	NO	PF	SC
m. 1	_____	_____	_____
m. 2	_____	_____	_____
m. 5	_____	_____	_____
m. 6	_____	_____	_____

2. Analyze the notes in the left hand in mm. 1-4 and in mm. 5-8.

	NO	PF	SC
mm. 1-4	_____	_____	_____
mm. 5-8	_____	_____	_____

3. Analyze both hands together in mm. 9-15 (excluding m. 12)

	NO	PF	SC
m. 9	_____	_____	_____
m. 10	_____	_____	_____
m. 11	_____	_____	_____
m. 13	_____	_____	_____
m. 14	_____	_____	_____
m. 15	_____	_____	_____

4. Describe the music in mm. 17-23. What's new about it (for this piece)? What part of it have we heard before?

5. Now describe what happens in mm. 22 to the end.

6. Is this short piece written with any formal archetype in mind? If so, what is it?

Music 214: Theory IV
Assignment No. 7

Name: *key*

Bartók, “Bulgarian Rhythm,” No. 115 from *Mikrokosmos* (Burkhart, pp. 447-8)

1. Analyze the pentachords that are presented in the right hand.

	NO	PF	SC
m. 1	<u>(79TE0)</u>	<u>(01235)</u>	<u>5-2</u>
m. 2	<u>(89TE1)</u>	<u>(01235)</u>	<u>5-2</u>
m. 5	<u>(TE012)</u>	<u>(01234)</u>	<u>5-1</u>
m. 6	<u>(79TE0)</u>	<u>(01235)</u>	<u>5-2</u>

2. Analyze the notes in the left hand in mm. 1-4 and in mm. 5-8.

	NO	PF	SC
mm. 1-4	<u>(7912)</u>	<u>(0157)</u>	<u>4-16</u>
mm. 5-8	<u>(E1234)</u>	<u>(01235)</u>	<u>5-2</u>

3. Analyze both hands together in mm. 9-15 (excluding m. 12)

	NO	PF	SC
m. 9	<u>(469T1)</u>	<u>(01469)</u>	<u>5-32</u>
m. 10	<u>(9E146)</u>	<u>(02479)</u>	<u>5-35</u>
m. 11	<u>(01469)</u>	<u>(01469)</u>	<u>5-32</u>
m. 13	<u>(01469)</u>	<u>(01469)</u>	<u>5-32</u>
m. 14	<u>(469T1)</u>	<u>(01469)</u>	<u>5-32</u>
m. 15	<u>(1469)</u>	<u>(0358)</u>	<u>4-26</u>

4. Describe the music in mm. 17-23. What's new about it (for this piece)? What part of it have we heard before?

- canon/round/imitation between right and left hands
- return of the first theme

5. Now describe what happens in mm. 22 to the end.

- right hand repeats the main motive
- left hand plays minor sevenths in ascending half steps
- left hand ends with a cadential seventh resolving to a 4-3 suspension

6. Is this short piece written with any formal archetype in mind? If so, what is it?

- *Any answer is acceptable so long as it doesn't appeal to the absurd or the supernatural for support.*

Music 214: Theory IV
Assignment No. 8

Name: _____

The following excerpt represents the Primary form of a row that is drawn from something you've never heard of. Convert it into integer notation, use it to complete the blank matrix, and provide the requested row forms.



P₆: _____

R₁: _____

I₂: _____

RI₃: _____

The following row is presented later in the same piece. Convert the notes into integers and complete the matrix. Then identify and complete the row form represented by each incipit provided below the matrix.



____: 7 3 4 5 _____

____: 9 8 E 0 _____

____: 5 9 8 7 _____

____: 4 5 2 1 _____

____: 5 4 7 8 _____

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 Assignment No. 8

Name: *key*

The following excerpt represents the Primary form of a row that is drawn from something you've never heard of. Convert it into integer notation, use it to complete the blank matrix, and provide the requested row forms.



0	3	2	6	7	8	1	T	5	4	E	9
9	0	E	3	4	5	T	7	2	1	8	6
T	1	0	4	5	6	E	8	3	2	9	7
6	9	8	0	1	2	7	4	E	T	5	3
5	8	7	E	0	1	6	3	T	9	4	2
4	7	6	T	E	0	5	2	9	8	3	1
E	2	1	5	6	7	0	9	4	3	T	8
2	5	4	8	9	T	3	0	7	6	1	E
7	T	9	1	2	3	8	5	0	E	6	4
8	E	T	2	3	4	9	6	1	0	7	5
1	4	3	7	8	9	2	E	6	5	0	T
3	6	5	9	T	E	4	1	8	7	2	0

P₆: 6 9 8 0 1 2 7 4 E T 5 3

R₁: T 0 5 6 E 2 9 8 7 3 4 1

I₂: 2 E 0 8 7 6 1 4 9 T 3 5

RI₃: 6 4 E T 5 2 7 8 9 1 0 3

The following row is presented later in the same piece. Convert the notes into integers and complete the matrix. Then identify and complete the row form represented by each incipit provided below the matrix.



0	1	T	9	7	8	3	E	4	5	6	2
E	0	9	8	6	7	2	T	3	4	5	1
2	3	0	E	9	T	5	1	6	7	8	4
3	4	1	0	T	E	6	2	7	8	9	5
5	6	3	2	0	1	8	4	9	T	E	7
4	5	2	1	E	0	7	3	8	9	T	6
9	T	7	6	4	5	0	8	1	2	3	E
1	2	E	T	8	9	4	0	5	6	7	3
8	9	6	5	3	4	E	7	0	1	2	T
7	8	5	4	2	3	T	6	E	0	1	9
6	7	4	3	1	2	9	5	T	E	0	8
T	E	8	7	5	6	1	9	2	3	4	0

RI₉: 7 3 4 5 T 6 1 2 0 E 8 9

I₉: 9 8 E 0 2 1 6 T 5 4 3 7

R₃: 5 9 8 7 2 6 E T 0 1 4 3

P₄: 4 5 2 1 E 0 7 3 8 9 T 6

I₅: 5 4 7 8 T 9 2 6 1 0 E 3

Music 214: Theory IV
Assignment No. 9

Name: _____

Schoenberg, *Piano Piece*, op. 33a, mm. 1-11 (You will need to photocopy the score from Burkhart, p. 431)

1. Find the normal order, prime form, and interval vector for each of the three chords in measure 1.

	beat 2	beat 3	beat 4
N.O.	_____	_____	_____
P.F.	_____	_____	_____
I.V.	_____	_____	_____

2. How does measure 2 relate to measure 1?

3. Determine the row for this piece and complete the matrix on the back of this sheet.

4. Circle and label each row form used in mm. 1-11. (NB! If your TA can't read your label, it's wrong.) List the row forms that are present in the first 11 measures.

5. How many combinatorial pairs can be created with the row forms you listed in No. 4?

6. Use measure numbers to show me where Schoenberg takes advantage of the combinatorial pairs you identified.

A matrix for Schoenberg's Piano Piece, op. 33a

Music 214: Theory IV
Assignment No. 9

Name: *key*

Schoenberg, *Piano Piece*, op. 33a, mm. 1-11 (You will need to photocopy the score from Burkhart, p. 431)

1. Find the normal order, prime form, and interval vector for each of the three chords in measure 1.

	beat 2	beat 3	beat 4
N.O.	____(TE05)____	____(1369)____	____(2478)____
P.F.	____(0127)____	____(0258)____	____(0146)____
I.V.	____(210021)____	____(012111)____	____(111111)____

2. How does measure 2 relate to measure 1?

M.2 is the same as m. 1, only upside-down and backwards, i.e., the RI version

3. Determine the row for this piece and complete the matrix on the back of this sheet.

4. Circle and label each row form used in mm. 1-11. (NB! If your TA can't read your label, it's wrong.) List the row forms that are present in the first 11 measures.

P_T, R_T, I₃, RI₃

5. How many combinatorial pairs can be created with the row forms you listed in No. 4?

4: P_T & R_T, P_T & I₃, I₃ & RI₃, R_T & RI₃

6. Use measure numbers to show me where Schoenberg combines the combinatorial pairs you identified.

Mm. 2-4: R_T & RI₃, m. 10: P_T & I₃, m. 11: R_T & RI₃

A matrix for Schoenberg's Piano Piece, op. 33a

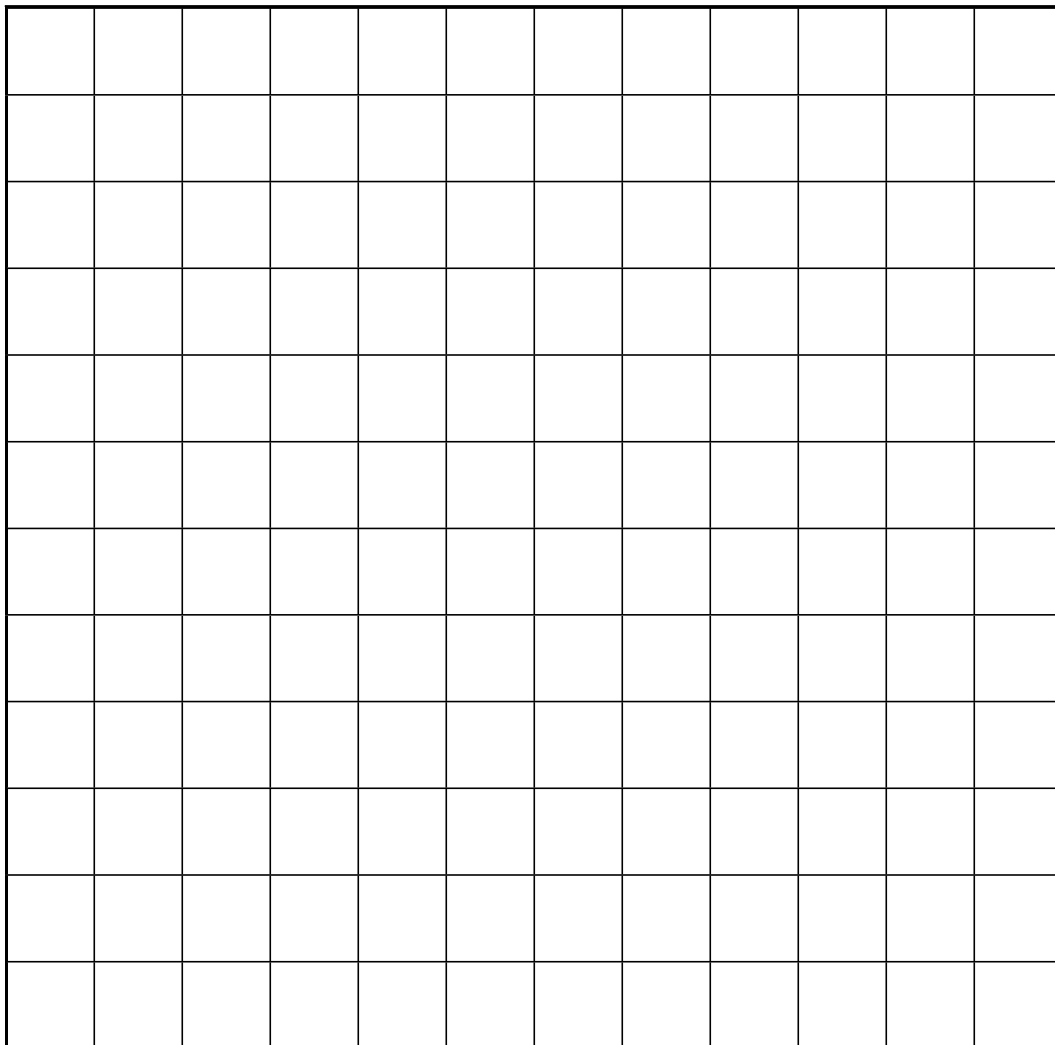
0	7	2	1	E	8	3	5	9	T	4	6
5	0	7	6	4	1	8	T	2	3	9	E
T	5	0	E	9	6	1	3	7	8	2	4
E	6	1	0	T	7	2	4	8	9	3	5
1	8	3	2	0	9	4	6	T	E	5	7
4	E	6	5	3	0	7	9	1	2	8	T
9	4	E	T	8	5	0	2	6	7	1	3
7	2	9	8	6	3	T	0	4	5	E	1
3	T	5	4	2	E	6	8	0	1	7	9
2	9	4	3	1	T	5	7	E	0	6	8
8	3	T	9	7	4	E	1	5	6	0	2
6	1	8	7	5	2	9	E	3	4	T	0

Music 214: Theory IV
Assignment No. 9 (alt)

Name: _____

Schoenberg, *Piano Piece*, op. 33a, mm. 1-11 (You will need to photocopy the score from Burkhart, p. 431)

1. How many discrete pitch classes are present in m. 1? And in m. 2?
2. How do the following chords in mm. 1-2 relate to each other?
 - a. Chords 1 and 6?
 - b. Chords 2 and 5?
 - c. Chords 3 and 4?
3. Based on your answers to the preceding questions, what deductions can you make concerning the row forms employed in the first two measures?
4. In mm. 3-5, locate melodic statements that correspond to the first six chords by circling them in the score and labeling them "Chord 1," "Chord 2," etc.
5. Construct the P_0 form of the row and complete the empty matrix on the reverse side of this page.
6. Circle and label each row form used in mm. 1-11. (NB! If your TA can't read your label, it's wrong.)
7. How do mm. 10-11 relate to mm. 1-2?
8. What technique did Schoenberg employ in these bars, allowing him to use two forms of the row simultaneously without pitch duplication?



Music 214: Theory IV
Assignment No. 9 (alt)

Name: *key*

Schoenberg, *Piano Piece*, op. 33a, mm. 1-11 (You will need to photocopy the score from Burkhart, p. 431)

1. How many discrete pitch classes are present in m. 1? And in m. 2?

12 & 12

2. How do the following chords in mm. 1-2 relate to each other?

a. Chords 1 and 6? *6 is 1, only upside-down, or inverted*

b. Chords 2 and 5? *same*

c. Chords 3 and 4? *same*

3. Based on your answers to the preceding questions, what deductions can you make concerning the row forms employed in the first two measures?

the chords in m. 1 are repeated backwards and upside-down, which translates to the retrograde inversion of the original row

4. In mm. 3-5, locate melodic statements that correspond to the first six chords by circling them in the score and labeling them “Chord 1,” “Chord 2,” etc.

5. Construct the P₀ form of the row and complete the empty matrix on the reverse side of this page.

6. Circle and label each row form used in mm. 1-11. (NB! If your TA can't read your label, it's wrong.)

7. How do mm. 10-11 relate to mm. 1-2?

The right hand in mm. 10–11 is the same as mm. 1 & 2. The left hand plays inversionally related chords/row forms on upbeats.

8. What technique did Schoenberg employ in these bars, allowing him to use two forms of the row simultaneously without pitch duplication?

hexachordal combinatoriality

A matrix for Schoenberg's *Piano Piece*, Op. 33a

0	7	2	1	E	8	3	5	9	T	4	6
5	0	7	6	4	1	8	T	2	3	9	E
T	5	0	E	9	6	1	3	7	8	2	4
E	6	1	0	T	7	2	4	8	9	3	5
1	8	3	2	0	9	4	6	T	E	5	7
4	E	6	5	3	0	7	9	1	2	8	T
9	4	E	T	8	5	0	2	6	7	1	3
7	2	9	8	6	3	T	0	4	5	E	1
3	T	5	4	2	E	6	8	0	1	7	9
2	9	4	3	1	T	5	7	E	0	6	8
8	3	T	9	7	4	E	1	5	6	0	2
6	1	8	7	5	2	9	E	3	4	T	0

Mäßig ♩ = 120 a) *cantabile*

Handwritten annotations include:

- PT** (Piano Texture) and **RT** (Right Texture) markings.
- chord 1** through **chord 6** labels.
- chord 3** label.
- I3** and **RT** circled groups of notes.
- poco rit** (poco ritardando) marking.
- a tempo** marking.

"Piano Piece, Op. 33a" UE 2991. © 1910 by Universal Edition A.G., Wien © renewed 1938 by Arnold Schoenberg. Reprinted with permission.

a) Moderato

Music 214: Theory IV
Assignment No. 10

Name: _____

Dallapiccola, *Goethe-lieder*, No. 2, “Die Sonne kommt!”

1. Determine the row for this piece and complete the matrix on the back of this sheet. (5)
2. T / F This piece is based on a derived row. (5)
3. What T_n or T_nI operation would you need to perform on the second trichord of the row to result in the pitch-classes in the fourth trichord? (10)
4. Which row forms are combinatorial with P_0 ? (5)
5. List the row forms Dallapiccola uses in this piece. (5)
6. List the three measures in which Dallapiccola breaks a 12-tone rule. (10)
7. Describe the structure of the Canto part from the beginning to the end in terms of the row forms, the contour of the melodic line, and the rhythm. (20)
8. Identify the musical relationship between Canto & Clarinet. (10)
9. Describe Dallapiccola’s method of “text painting.” In other words, how does he use the music to enhance or reflect the meaning of Goethe’s poem? (30)

A matrix for Dallapiccola's "Die Sonne kommt!"

Music 214: Theory IV
Assignment No. 10

Name: *key*

Dallapiccola, *Goethe-lieder*, No. 2, “Die Sonne kommt!”

1. Determine the row for this piece and complete the matrix on the back of this sheet. (5) *See the back of this sheet.*
2. T / [F] This piece is based on a derived row. (5)
3. What T_n or T_nI operation would you need to perform on the second trichord of the row to result in the pitch-classes in the fourth trichord? (10) *T_5I or T_1I*
4. Which row forms are combinatorial with P_0 ? (5) *only R_0*
5. List the row forms Dallapiccola uses in this piece. (5)

P_8, I_9, RI_9, R_8

6. List the three measures in which Dallapiccola breaks a 12-tone rule. (10)

6, 12, & 13

7. Describe the structure of the Canto part from the beginning to the end in terms of the row forms, the contour of the melodic line, and the rhythm. (20)

It is a total palindrome, reaching its apex in m. 9.

8. Identify the musical relationship between Canto & Clarinet. (10)

The clarinet enters long after the voice, but traces the exact same path.

9. Describe Dallapiccola’s method of “text painting.” In other words, how does he use the music to enhance or reflect the meaning of Goethe’s poem? (30)

Arcs in the sky are mimicked by arcs in pitch space; the sun and moon are embodied by the clarinet and voice; the word “crescent” is reflected in the crescent shape of the line in bar 6; and anything else that’s reasonable.

A matrix for Dallapiccola's "Die Sonne kommt!"

0	1	E	9	3	8	6	7	2	5	4	T
E	0	T	8	2	7	5	6	1	4	3	9
1	2	0	T	4	9	7	8	3	6	5	E
3	4	2	0	6	E	9	T	5	8	7	1
9	T	8	6	0	5	3	2	E	2	1	7
4	5	3	1	7	0	T	E	6	9	8	2
6	7	5	3	9	2	0	1	8	E	T	4
5	6	4	2	8	1	E	0	7	T	9	3
T	E	9	7	1	6	4	5	0	3	2	8
7	8	6	4	T	3	1	2	9	0	E	5
8	9	7	5	E	4	2	3	T	1	0	6
2	3	1	E	5	T	8	9	4	7	6	0