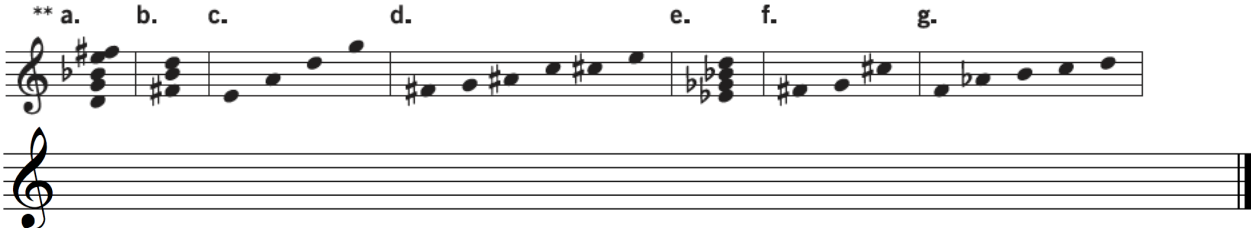
Due January 20, 2022
NAME:

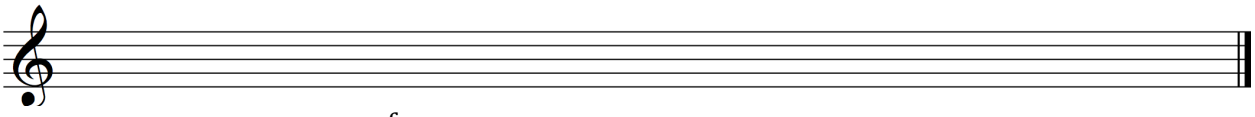
Theory (70%)

I. *Normal Form: The normal form of a pitch-class set is its most compact representation..*

1. Put these collections into normal form on the staff below, written in the form of an ascending scale within the octave:



a. b. c. d.



e. f. g.

2. Put the following collections into normal form using integers. Write your answer within square brackets:

a. 11, 5, 7, 2

b. 0, 10, 5

c. 7, 6, 9, 1

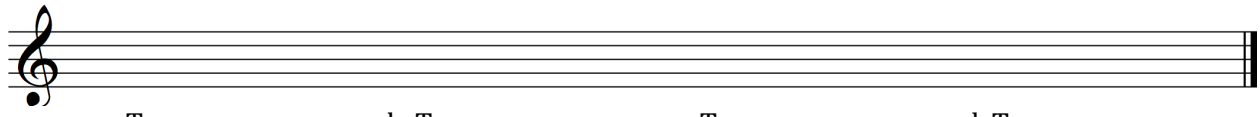
d. 4, 7, 2, 7, 11

e. the C-major scale

f. Eb C B, Bb, E, G

II. *Transposition: Transposition (T_n) involves adding some transposition interval (n) to each member of a pitch-class set. Two pitch-class sets are related by T_n if, for each element x in the first set, there is a corresponding element y in the second set n semitones away.*

1. Transpose pitch-class sets a, b, c and d notated in I.1 as indicated. The sets are given in normal form; write your answer also in normal form on the staff below.



a. T_8 b. T_3 c. T_6 d. T_4

2. Transpose the following pitch-class sets as indicated. Write your answers in normal form using integer notation.

a. T_3 [8, 0, 3]

b. T_9 [2, 4, 7, 10]

c. T_6 [5, 7, 9, 11, 2]

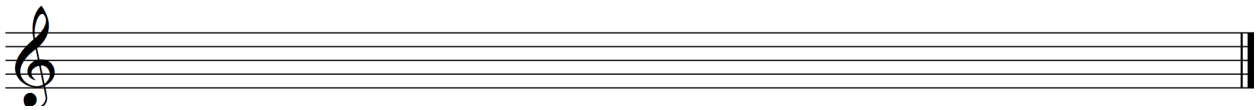
d. T_7 [9, 11, 1, 2, 4, 6]

3. Are the following pairs of pitch-class sets related by transposition? If so, what is the interval of transposition? All the sets are given in normal form.

a. [8, 9, 11, 0, 4] [4, 5, 7, 8, 0]
b. [7, 9, 1] [1, 5, 7]
c. [7, 8, 10, 1, 4] [1, 2, 4, 7, 10]
d. [1, 2, 5, 9] [11, 0, 3, 7]

III. *Inversion: Inversion (I_n) involves subtracting each member of a pitch-class set from the index number n. Two pitch-class sets are related by I_n if, for each element x in the first set, there is a corresponding element y in the second set such that x + y = n. When the sets are in normal form, the first elements of one corresponds to the last element of the other, the second elements of one corresponds to the second-t-last element of the other, and so on.*

1. Invert the pitch-class sets from I.1 as indicated. Put your answer in normal form and write it on the staff below.



a. I_5 b. I_{10} c. I_0 d. I_6 e. I_7

2. Invert the following pitch-class sets as indicated. Use integer notation and write your answers in normal form.

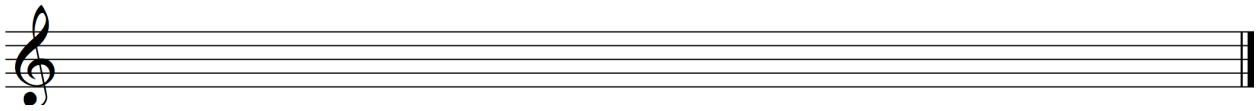
a. I_9 [9, 10, 0, 2]
b. I_0 [1, 2, 5]
c. I_3 [1, 2, 4, 7, 10]
d. I_{10} [10, 11, 0, 3, 4, 7]
e. I_6 [4, 7, 10, 0]
f. I_4 (C-major scale)
g. I_3 [1, 3, 5, 8]
h. I_9 [10, 1, 3, 6]

3. Are the following pairs of pitch-class sets related by inversion? If so, what is the value of n in I_n? All the sets are given in normal form.

a. [2, 4, 5, 7] [8, 10, 11, 1]
b. [4, 6, 9] [4, 7, 9]
c. [1, 2, 6, 8] [9, 11, 2, 3]
d. [4, 5, 6, 8, 10, 1] [3, 6, 8, 10, 11, 0]
e. [8, 9, 0, 4] [4, 8, 11, 0]
f. [5, 9, 11] [7, 9, 1]
g. [4, 5, 8, 11] [10, 1, 4, 5]

IV. *Inversion: Inversion (I^x_y) involves mapping each note in a pitch-class set onto a corresponding note by performing whatever inversion maps x onto y.*

1. Invert the pitch-class sets notated in the middle of p. 73 (IV. 1) as indicated. Put your answer in normal form and write it on the staff below.



a. I^G_B b. $I^{F\#}_G$ c. I^F_F d. I^B_C e. $I^E_{G\#}$

2. Invert the following pitch-class sets as indicated. Put your answer in normal form.

a. I^{Ab}_{Bb} [G, A^b, B^b, B]
b. I^{Ab}_A [B, C, D, F, $F^\#$]
c. I^D_D [B, C, D, E, F, G]

d. $I^{C\#}_{C\#}$ [F#, G#, B, C#] e. I^{D}_{Ab} [C#, D#, G, A]

3. Using the I^{x}_{y} notation, give at least two labels for the operation that connects the following pairs of inversionally related sets.

a. [G, G#, B] [G, Bb, B] b. [C#, D, F, G] [G, A, C, C#]
c. [Ab, A, Db, Eb] [A, B, D#, E] d. [D, E, F] [F, A, C]
e. [G#, A, A#, B, C, D] [C#, D#, E, F, F#, G]

V. *Prime Form: The prime form is the way of writing a set that is most compact and most packed to the left, and begins on 0.*

1. Put each of the following pitch-class sets in prime form. All the sets are given in normal form.

a. [10, 3, 4] b. [7, 8, 11, 0, 1, 3] c. [G, B, D]
d. [2, 5, 8, 10] e. [1, 4, 6, 9, 10] f. [C#, D, G, Ab]

2. Are the following pitch-class sets in prime form? If not, put them in prime form.

a. (0, 1, 7) b. (0, 2, 8) c. (0, 2, 6, 9) d. (0, 1, 4, 5, 8, 9)

VI. *The List of Set Classes.*

1. Name all the tetrachords that contain two tritones.

2. What is the largest number of interval class 4s contained by a tetrachord? Which tetrachords contain that many?

3. Which trichord(s) contain both a semitone and a tritone?

4. Which tetrachords contain one occurrence of each interval class? (Notice that they have different prime forms).

5. How many trichords are there? How many nonachords (nine-note sets)? Why are these numbers the same?

6. Which hexachords have no ocurrences of some interval?

Analysis (30%)

Kaija Saariaho, *From the Grammar of Dreams*, III (1988)

Kaija Saariaho composed this song cycle— five unaccompanied duets for soprano and mezzo-soprano—on a late poem of Sylvia Plath, "Paralytic." The text describes the thoughts of a man in an iron lung, a polio victim who cannot respond to his (female) family and nurses. Song III is the central song of the cycle, and sets the concluding lines of the poem: "The claw / Of the magnolia, / Drunk on its own scents, / Asks nothing of life."

1. In this analytical exercise, we will identify the first four pcs as a central tetrachord in this passage: A#, F, B and F# (mm. 1≠4). Analyze both the Normal Form and the Prime Form of this set. Note any abstract features of this tetrachord that you find significant.

2. This exact set does not return until the end (the final three notes of the mezzo paired with the last note in soprano). How does its arrangement at the end comment on its first appearance?

3. Give the Normal and Prime Form for the following tetrachord A-Eb-B-C (m. 5). Can you locate another linear form of this tetrachord that shares one pitch with m. 5?

4. Locate two or three instances of tetrachords later in the movement which share pcs with the opening four measures.

5. Can you find an example of tetrachords in transposition or inversion (these can be the same ones you located above, analyzed as linear sets or a combination of linear and harmonic, on one or both voices).

6. Finally, describe any other aspects of the song that communicate to you the force of the poem, and its combination of darkness and beauty.