

## MAT 120

## Quiz 2

Fall 2018

- An interval of five equal tempered semitones is within 5 cents of which frequency ratio?  
 a)  $5/4$                       b)  $4/3$                       c)  $3/2$                       d)  $9/8$                       e)  $5/3$   
 Correct Answer:  $4/3$
- An interval of two equal tempered semitones is within 5 cents of which frequency ratio?  
 a)  $5/4$                       b)  $4/3$                       c)  $3/2$                       d)  $9/8$                       e)  $5/3$   
 Correct Answer:  $9/8$
- A frequency ratio of 5 corresponds to the interval of two octaves plus a ...?  
 a) perfect fifth              b) major third              c) minor third              d) major sixth              e) perfect fourth  
 Correct Answer: major third
- 7 just major thirds corresponds to how many equal tempered semitones?  
 a) 28                      b) 27                      c) 26                      d) 25                      e) 24  
 Correct Answer: 27
- Suppose a *Major* scale has seven steps, each of which can be referred to loosely as a whole step or a half step. Suppose also that each whole step has cent value  $w$  and each half step has cent value  $h$ , and that  $h \neq \frac{1}{2}w$ , and that the scale ends an octave higher than its starting note. Which of the following are True statements?  
 i) the scale could be Equal-Tempered  
 ii) the scale could be Pythagorean  
 iii) the scale could be Just  
 a) ii) and iii) only              b) i) and ii) only              c) all of them              d) ii) only              e) iii) only  
 Correct Answer: ii) only
- A major triad chord consists of harmonic tones with frequency ratios given by:  $1 \rightarrow \frac{5}{4} \rightarrow \frac{3}{2}$ . Suppose the lowest tone has fundamental frequency 220 and all harmonics in each tone have the same amplitude, and when we play tones together we add the amplitudes of harmonics with the same frequency. If each tone has only five harmonics, including the fundamental (the harmonics only go up to the multiple of 5), which frequency will be the loudest?  
 a) 220                      b) 275                      c) 660                      d) 550                      e) 330  
 Correct Answer: 660
- In the same chord as in the previous question, if we change the middle tone to the closest equal-tempered note, what is the smallest number of beats, to the closest whole number, that we will hear?  
 a) 9                      b) 6                      c) 7                      d) 8                      e) 5  
 Correct Answer: 9
- How many beats per second would be generated by playing  $A_{220}$  and a syntonic comma (frequency ratio  $81/80$ ) above this note, if we are just listening to beating of the fundamental frequencies?  
 a) 3.25                      b) 2                      c) 2.75                      d) 4                      e) 3.75  
 Correct Answer: 2.75