S5 Music Practice Paper I Intervals and tuning, tempo and duration, transposition, chords, dynamics and form

S5 Music I Time allowed: 75 minutes I Total: 100 marks I 24 questions

Part A Intervals, frequency ratios and cents

Question 1 (17 marks)

1. The standard pitch A4 is 440 Hz. Find the frequency of A5 and state the frequency ratio and the size of an octave in cents. (4 marks)

2. In just intonation a perfect fifth has a 3:2 ratio. Find the frequency of E5 above A4 and the size of this interval in cents. (4 marks)

3. In equal temperament E5 = 440 x 2^(7/12) = 659.26 Hz. Find its deviation from the just fifth in cents and say whether the difference is audible. (4 marks)

4. Using A4 = 440 Hz, compare the frequency of a just major third (5:4) with an equal tempered major third in Hz and cents, and explain why pianos use equal temperament. (5 marks)

Part B Beat values and total duration

Question 2 (17 marks)

5. A passage is in 4/4 with a crotchet = 120. Find the length of one bar in seconds and the playing time of a 32 bar piece. (4 marks)

6. A waltz in 3/4 with a crotchet = 60 has 48 bars. Find the length of one bar and the total duration. (4 marks)

7. An introduction in 4/4 with a crotchet = 96 is 24 bars long. Find its duration, and the reduction in seconds if the tempo becomes crotchet = 120. (4 marks)

8. In a 4/4 passage at crotchet = 80, how many seconds does a dotted crotchet and a dotted minim each last? (5 marks)

Part C Transposition and key signatures

Question 3 (16 marks)

9. How many sharps are in the key signatures of D major and A major, and which notes are they? (4 marks)

10. A melody spans D4 = 293.66 Hz to B4. Find the frequency of B4, the name of the interval and the number of semitones. (4 marks)

11. If the melody is transposed up a perfect fifth into A major, find the transposition in cents and the frequency of the new lowest note. (4 marks)

12. After transposition the highest note is F sharp 5. Find its frequency and explain why accidentals must be rewritten to match the new key signature. (4 marks)

Part D Scale and chord frequencies

Question 4 (16 marks)

13. Taking C4 = 261.63 Hz as the tonic, find the frequency of G4, the fifth degree of C major, and state how many semitones above C4 it lies. (4 marks)

14. A just major triad has the frequency ratio 4:5:6. If the root is 264 Hz, find the three frequencies. (4 marks)

15. In equal temperament with a root of 264 Hz, find the major third and perfect fifth, and give the deviation from just intonation in cents. (4 marks)

16. A G7 chord is built on G, B, D and F. Given G4 = 392.00 Hz, find the frequency of F5 and give the interval and semitone count from G to F. (4 marks)

Part E Dynamics, decibels and hearing protection

Question 5 (17 marks)

17. A full ensemble plays at about 100 dB while a solo plays at about 60 dB. Find the difference in decibels and the ratio of sound intensity. (4 marks)

18. For the same 40 dB difference, what is the ratio of sound pressure amplitude? (4 marks)

19. If the maximum safe exposure at 88 dB is 4 hours, and the allowed time halves for every 3 dB increase, find the limit at 94 dB. (4 marks)

20. A Chinese orchestra rehearsal lasts 2 hours at an average of 91 dB. Does it exceed the 88 dB / 4 hour standard, and what should be done? (5 marks)

Part F Musical form and playing time

Question 6 (17 marks)

21. A sonata form movement has a 96 bar exposition, 64 bar development, 96 bar recapitulation and 24 bar coda. Find the total bars and the percentage taken by the exposition. (4 marks)

22. If the climax is placed at 61.8 per cent of the movement, the golden ratio, at which bar does it fall? (4 marks)

23. The movement is in 4/4 at a crotchet = 132. Find the total playing time in seconds and in minutes. (4 marks)

24. If the exposition is repeated as marked, what are the new total bars and playing time? (5 marks)