S5 Music Practice Paper with Answers

Music · S5 · Data-response

S5 music practice paper with answers on acoustics, cents, scales, transposition, tempo, note values, triplets, instrument upkeep and concert box office. Full marking scheme.

Part 1: Acoustics, frequency and cents

Data A (simulated): the international standard pitch A4 is 440 Hz; a perfect fifth has a frequency ratio of 3:2; in equal temperament one semitone equals 100 cents. Study the data and answer all parts.

#	Question
1	Calculate the frequency of A5, one octave above A4.
2	Calculate the frequency of E5, a perfect fifth above A4.
3	A#4 has a frequency of 466.16 Hz. Using cents = 1200 x log2(f2 / f1), calculate the interval in cents between A4 and A#4, to one decimal place.
4	During tuning a player produces A at 452 Hz, which is above the standard A4 (440 Hz). (1) Calculate the difference in cents, to one decimal place. (2) State whether this lies within the plus or minus 5 cents normally accepted by an ensemble, and explain. (3) Suggest one practical way to correct the tuning.

Part 2: Scale structure and transposition

Data B: a major scale is built on the pattern whole, whole, half, whole, whole, whole, half; a just major third has a frequency ratio of 5:4; each equal-tempered semitone is 100 cents.

#	Question
5	State the interval pattern of a major scale and identify the two semitone steps in the C major scale.
6	Starting on D, write the eight notes of the D major scale and state how many sharps are in its key signature.
7	A piece in C major is performed two semitones higher. Name the new key and state which note the original G moves to.
8	Using the frequency ratio, calculate the size in cents of a just major third (5:4) to the nearest cent, compare it with the equal-tempered major third (400 cents), and explain the audible effect of the difference.

Part 3: Metre, tempo and performance time

Data C: a piece is in 4/4 time with a tempo marking of quarter note = 96 (that is 96 quarter-note beats per minute); the piece has 32 bars in total.

#	Question
9	Calculate the duration of one beat (one quarter note) in seconds, to three decimal places.
10	Calculate the playing time of one bar in seconds, to three decimal places.
11	Calculate the total playing time of the piece in seconds and in minutes and seconds.

#	Question
12	If the conductor changes the tempo to quarter note = 84, calculate the new total time and the difference from the original (each to one decimal place), and explain how this affects the concert running order.

Part 4: Dotted notes and triplets

Data D: a dotted note lasts 1.5 times its undotted value; a triplet divides one beat into three equal parts; another piece is in 6/8 time at dotted quarter note = 100 (that is 100 dotted quarter beats per minute).

#	Question
13	Calculate the value of a dotted minim (dotted half note) in quarter-note beats.
14	In one 4/4 bar, give two different combinations of notes that exactly fill the bar (name each note and its quantity).
15	In 6/8 time each bar contains two dotted quarter beats. Calculate the duration of one beat, of one bar, and of 16 bars (in seconds, to two decimal places).
16	In a passage at quarter note = 90, calculate the duration of each note of a triplet within one beat (to four decimal places) and state the most common rhythmic fault when playing triplets.

Part 5: Practice time and instrument upkeep costs

Data E (simulated): an S5 student practises the piano 5 days a week for 45 minutes a day, and the violin 2 days a week for 30 minutes a day. The piano is tuned 2 times a year at 680 dollars each time; the violin strings are replaced once a year at 420 dollars.

#	Question
17	Calculate the student total practice time per week in minutes and in hours and minutes.
18	A term lasts 12 weeks. With the same routine, calculate the total practice hours for the term, to one decimal place.
19	Assuming the upkeep routine stays the same for 5 years, calculate the total upkeep cost over those 5 years.
20	(1) Calculate the present average daily practice time in minutes, to one decimal place. (2) To raise the average to 60 minutes a day, how many extra minutes a week are needed? (3) Calculate the required percentage increase to one decimal place and comment on whether it is realistic.

Part 6: Concert costs and box office

Data F (simulated): a school concert costs 12,000 dollars for the venue, 8 players at 800 dollars each, 6,500 dollars for sound and lighting, and 3,500 dollars for promotion; the venue holds 400 seats.

#	Question
21	Calculate the total cost of the concert.
22	If every seat is sold, calculate the break-even ticket price to the nearest dollar.

#	Question
23	The ticket price is set at 120 dollars and 320 tickets are sold. Calculate the ticket revenue, the profit and the seat occupancy rate (to the nearest whole percent).
24	If the price is raised to 150 dollars and only 250 tickets are sold, (1) calculate the profit; (2) state how much it differs from the previous part; (3) suggest one practical way to raise revenue.

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