S3 Music Practice Paper 1 | Pitch and frequency, time signatures, tempo, intervals, chords and concert income

Junior Secondary Music

S3 Music practice paper with answers: pitch and frequency, note values and time signature, tempo and playing time, intervals, chords, transposition and concert costs.

1. Pitch and frequency (18 marks)

The frequency doubles at each octave; take A4 as 440 Hz.

#	Question	Answer and marking notes
1	(a) A4 has a frequency of 440 Hz. Find the frequency of A5 one octave above and A3 one octave below.	Answer: A5 = 440 x 2 = 880 Hz; A3 = 440 / 2 = 220 Hz.
2	(b) Middle C (C4) has a frequency of 261.6 Hz. State whether it is higher or lower than A4 and find the difference in Hz (1 decimal place).	Answer: 261.6 Hz is lower than 440 Hz; the difference is 440 - 261.6 = 178.4 Hz.
3	(c) A flute sounds a note of 1760 Hz. Using A4 = 440 Hz, find how many octaves above A4 that note is.	Answer: 1760 / 440 = 4 = 2 x 2, so the note is two octaves above A4 (A6).
4	(d) That 440 Hz sound travels at 340 m/s in air. Find its wavelength in m (3 decimal places) and its period in s (4 decimal places).	Answer: Wavelength = 340 / 440 = 0.773 m; period = 1 / 440 = 0.0023 s (2.3 ms).

2. Note values and time signatures (16 marks)

A crotchet is one beat, a semibreve four beats, and a dot adds half the value.

#	Question	Answer and marking notes
5	(a) A piece is in 4/4 time and has 32 bars. Find the total number of beats.	Answer: Total beats = 4 x 32 = 128 beats.
6	(b) Two dotted minims are placed in one bar of 4/4. Decide whether this fits and state the difference.	Answer: Each dotted minim is 3 beats, so two need 6 beats; that is 2 beats more than a 4 beat bar, so it does not fit.
7	(c) A piece in 3/4 time has 24 bars and is played at 90 beats per minute. Find the total beats and the playing time in seconds.	Answer: Beats = 3 x 24 = 72; time = 72 / 90 x 60 = 48 seconds.
8	(d) A piece in 6/8 time has 18 bars. Find the total number of quavers and the equivalent number of crotchets.	Answer: Quavers = 6 x 18 = 108; that equals 108 / 2 = 54 crotchets.

3. Tempo and playing time (16 marks)

Tempo is given in beats per minute (BPM); playing time = total beats / BPM x 60.

#	Question	Answer and marking notes
9	(a) A piece in 4/4 time is played at 120 BPM and has 60 bars. Find the seconds per bar and the total playing time.	Answer: Per bar = 4 / 120 x 60 = 2 seconds; total = 60 x 2 = 120 seconds (2 minutes).
10	(b) A piece lasts 5 minutes 30 seconds at 90 BPM. Find the total number of beats.	Answer: Time = 330 seconds; total beats = 330 x 90 / 60 = 495 beats.
11	(c) A piece in 3/4 time has 240 bars at 100 BPM. Find the playing time in minutes (1 decimal place).	Answer: Total beats = 3 x 240 = 720; time = 720 / 100 x 60 = 432 seconds = 7.2 minutes.
12	(d) The same piece is sped up from 100 BPM to 120 BPM. Find the time saved in seconds and the percentage increase in speed.	Answer: At 120 BPM the time is 720 / 120 x 60 = 360 seconds; 432 - 360 = 72 seconds saved; the speed rises by (120 - 100) / 100 x 100 = 20 per cent.

4. Intervals and semitones (16 marks)

An octave has 12 semitones; a perfect fifth has 7, a perfect fourth 5, a major third 4 and a minor third 3.

#	Question	Answer and marking notes
13	(a) C to G is a perfect fifth. State the number of semitones in this interval.	Answer: A perfect fifth contains 7 semitones.
14	(b) Starting on C4, move up 7 semitones. Name the note reached.	Answer: 7 semitones above C4 is G4.
15	(c) How many semitones apart are a major third and a minor third? Give both semitone counts.	Answer: A major third has 4 semitones and a minor third 3, so they differ by 1 semitone.
16	(d) A melody rises from D to A (perfect fifth) and then from A to the D above (perfect fourth). Find the total semitones and decide whether it equals one octave.	Answer: 7 + 5 = 12 semitones, which is exactly one octave (12 semitones).

5. Chords and transposition (18 marks)

A major triad is built from the root, a major third and a perfect fifth; transposition moves every note by the same number of semitones.

#	Question	Answer and marking notes
17	(a) The C major triad is C, E and G. Find the semitones from C to E and from E to G.	Answer: C to E is 4 semitones (major third); E to G is 3 semitones (minor third).
18	(b) Transpose that chord up 2 semitones and name the three notes of the new chord.	Answer: Moving every note up 2 semitones gives D, F sharp and A, the D major triad.

#	Question	Answer and marking notes
19	(c) A piece is in C and the instrument needs the music 3 semitones lower. Find the new first note and state the direction of transposition.	Answer: Three semitones below C (C, B, B flat, A) is A; the music moves down 3 semitones.
20	(d) In a four part chord the soprano sings G4 (392 Hz) and the bass sings G2 (98 Hz). Find the frequency ratio and the number of octaves apart.	Answer: Ratio = 392 / 98 = 4; 4 = 2 x 2, so they are two octaves apart.

6. Orchestra layout and concert ticket income (16 marks)

Percentages must total 100 and money is in dollars.

#	Question	Answer and marking notes
21	(a) An orchestra has 80 players: strings 50 per cent, woodwind 20 per cent, brass 15 per cent and percussion 15 per cent. Find the number in each group.	Answer: 40 strings, 16 woodwind, 12 brass and 12 percussion, making 80 players.
22	(b) A hall has 850 seats and 782 tickets are sold. Find the attendance rate as a percentage (1 decimal place).	Answer: Attendance = 782 / 850 x 100 = 92.0 per cent.
23	(c) Student tickets at 180 dollars sell 320 copies and adult tickets at 450 dollars sell 462 copies. Find the total ticket income.	Answer: Students = 320 x 180 = 57,600 dollars; adults = 462 x 450 = 207,900 dollars; total = 265,500 dollars.
24	(d) The concert costs 210,000 dollars. Find the profit or loss of the first concert, then of a second concert with the same cost, 80 per cent attendance and all adult tickets.	Answer: First concert profit = 265,500 - 210,000 = 55,500 dollars; the second sells 850 x 0.8 = 680 tickets for 306,000 dollars, a profit of 96,000 dollars.