edexcel

Mark Scheme (Results)

Summer 2015

Pearson Edexcel GCE in Music Technology (6MT04/01)

Paper 1: Analysing and Producing

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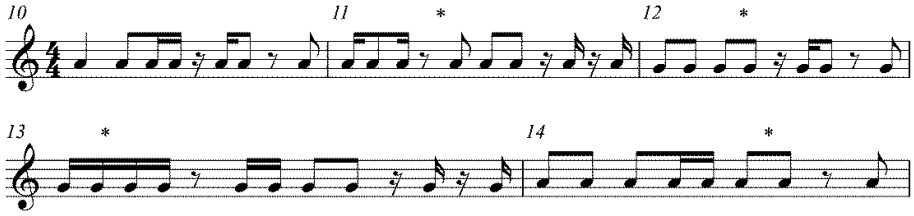
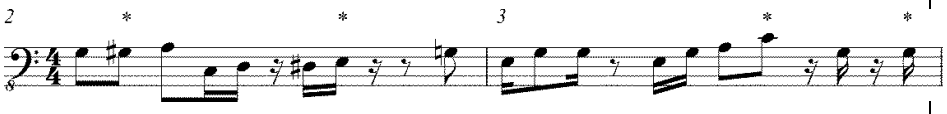
General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Question	Mark
1(a)	Compare **bars 2-9** with **bars 32-39** of the synthesiser part. Identify three differences in the music and/or production.	3
	Acceptable Answers	
	Different timbre / additional oscillator (1) not 'polyphonic' The end is different/pitchbend /sudden stop (1) Staccato (in 2-9) / legato (in 32-39) / long decay/release (in 32-39) / more sustained (in 32-39) / higher sustain level (in 32-39) (1) Filter cutoff is fixed (in 2-9) / cutoff modulates / is automated (in 32-39) / more harmonics / higher cutoff (in 32-39) (1) (Wider) stereo (in 32-39) (1) not 'panning' No octave jumps (in bar 2-5) / octave jumps on the Gs (1)	

Question Number	Question	Mark
1(b)	**Bars 10–14** of the synthesiser part are notated below. Fill in the rhythm of the **four** missing beats (each marked by an asterisk).	4
	Acceptable Answers	
	 Assess rhythm only	

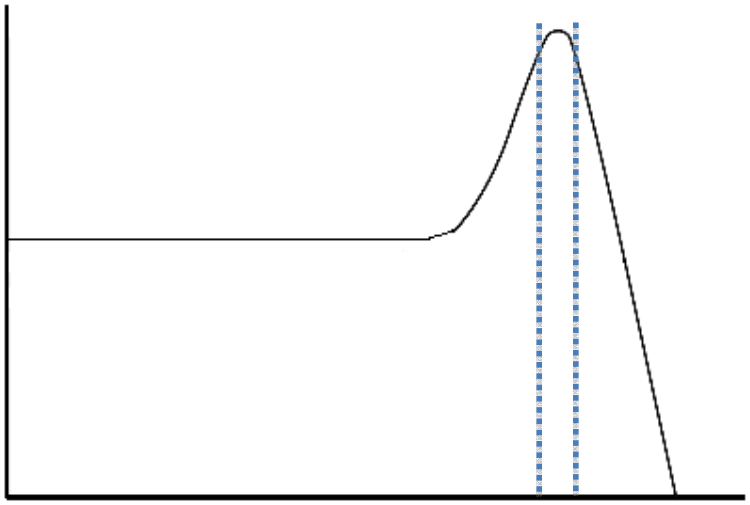
Question Number	Question	Mark
1(c)	**Bars 2–3** of the synthesiser part are notated below. Fill in the **four** missing pitches (each marked by an asterisk).	4
	Acceptable Answers	
	 Accept enharmonic equivalents. Assess pitch only. Sharps after the notes are not credited.	

Question Number	Question	Mark
1(d)	Identify the effect added to the synthesiser in **bars 22-31**. Describe the settings that would have been used.	4
	Acceptable Answers	
	Delay / echo (1) Stereo / Ping-pong / panning (1) (Tempo synced) 16s / semiquavers / dotted quavers (1) Feedback / repeat: 25%-75% / medium / high / same on both sides (1) Mix of 10-40% / send of between -30dB and -10dB / medium wet / high wet (1)	

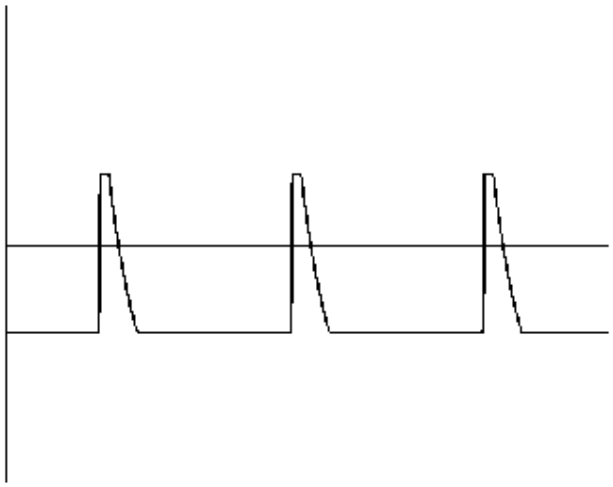
Question Number	Question	Mark
1(e)(i)	Identify the filter used.	1
	Acceptable Answers	
	C Low Pass Filter	

Question Number	Question	Mark
1(e)(ii)	How can you tell from the graph that resonance was increased?	1
	Acceptable Answers	
	Any description of the peak / bump / boost (at cutoff frequency) (1)	

Question Number	Question	Mark
1(e)(iii)	Label the two axes of the graph.	2
	Acceptable Answers	
	y-axis: amplitude / gain / volume / dB (1) x-axis: frequency / Hz / kHz (1) [Ignore capitalisation for both] Apply SONC	

Question Number	Question	Mark
1(e)(iv)	Draw a cross to indicate the cutoff frequency.	1
	Acceptable Answers	
	Accept anywhere in the range shown by the dotted lines. 	

Question Number	Question	Mark
1(f)(i)	What waveform was selected on the synthesiser?	1
	Acceptable Answers	
	A Saw	

Question Number	Question	Mark
1(f)(ii)	Clipping distortion was added to the synthesiser. On the blank graph below, draw the clipped version of waveform shown above.	(1)
	Acceptable Answers	
	Allow any squaring of waveform at top and/or bottom. 	

Question Number	Question	Mark
2(a)(i)	What is the highest note velocity in the drum part?	1
	Acceptable Answers	
	127	

Question Number	Question	Mark
2(a)(ii)	What is the lowest note velocity in the drum part?	1
	Acceptable Answers	
	7	

Question Number	Question	Mark
2(b)(i)	The notes in the MIDI file have been assigned to the incorrect sounds. Using an acoustic drum kit, assign the notes to the sounds listed below to form a disco drum part. You should not change the rhythm. • Kick drum • Snare drum • Closed hi-hat • Open hi-hat • Crash cymbal	5
	Acceptable Answers	
	1 mark for each correctly assigned drum sound that plays the correct rhythm, in sync throughout. If the drums are not soloed, or metronome is switched on, then assess what can be heard clearly. Ignore tempo.	

Question Number	Question	Mark
2(b)(ii)	Balance the drum track.	2
	Acceptable Answers	
	The original MIDI file has the following velocities: Kick: 7 Snare: 62 Hi-hats: 127 Crash cymbal: 103	

2	Kick & snare are same volume, whilst hi-hats are slightly quieter.
1	Poorly balanced, e.g. hi-hats louder than kick & snare; kick & snare not same volume; any drum is partially masked.
0	Velocities have not been edited (kick very quiet / hats loud) OR Not all drums present/additional drums.
	If the drums are not soloed, or metronome is switched on, then assess what can be heard clearly. If kick and/or snare are significantly off centre then max 1.

Question Number	Question	Mark
3(a)	Identify the **two** performance techniques used in **bars 2-9** of the bass guitar part.	2
	Acceptable Answers	
	Harmonics (1) Picked / fingered (1) not 'plucked' Slap / pop (1) Vibrato/pitch wobble/note bend/string bend (1) Not 'pitch bend' or 'modulation'	

Question Number	Question	Mark
3(b)	The bass guitar was recorded using DI. There is hiss on the recording. Excluding signal processing, identify **three** precautions that could be taken to reduce hiss whilst recording DI bass guitar.	3
	Acceptable Answers	
	Check connections/wires / plugged in properly / damaged cables / check pots/knobs (1) Well shielded cables (1) Turn volume on guitar down in silent passages (1) No electric devices nearby / turn off lights / mobile phones (1) Turn up bass guitar to maximum (1) Noiseless pickups / humbucker / double coil (1) Use balanced signal / XLR (1) Use short lead (1) Turn up gain (on pre-amp / interface) / high input / high record level (1) (not computer) Use audio interface / pre-amp with better signal to noise ratio / dynamic range / good ADC (1) Ground lift (1) Active / good transformer in DI box (1) Use active bass guitar (1) Standing in location with least hum / angle where hum is least (1) Signals crossing power cables at right angles (1) Play bass guitar louder / hit strings harder / use pick (1) Gain structure (1) Remove pedals / amp (1) Check (digital) clock synchronisation (1) Avoid using valve pre-amp (1) Greater bit depth (1)	

Question Number	Question	Mark
3(c)	The settings below were used on the gate on the vocal recording. Why has the gate not completely removed the background noise?	3
	Acceptable Answers	
	Threshold too low / not set high enough / needs to be higher (1). Release set too long (1). Range too narrow / too low / not set high enough / needs to be higher/wider/increased (1). Some loud noises / paper rustle as loud as the vocal (1), so high threshold would cut vocal (1).	

Question Number	Question	Mark
3(d)	Between **bars 2-9**, the singer noticed that the some of the vocal had clipped. Remove the distortion whilst leaving the vocal melody unchanged.	3
	Acceptable Answers	
	Listen to the second phrase from 0:05 of task 2. The candidate should have replaced the second phrase with the corresponding fourth phrase of the intro. You will need to check the timing by listening to task 3.	

Mark	Preparation of vocal track — removing unwanted distortion
3	The second phrase has been replaced with the fourth phrase and the singing is in time.
2	All of the distortion has been cut out and only singing remains but there are timing errors of more than a semiquaver and less than a crotchet. OR The wrong phrase from the intro has been used.
1	Fading/cutting/EQ/other distortion removal processing AND/OR Timing errors of more than a crotchet AND/OR A vocal phrase from the wrong part of the song has been used.
0	No attempt at cutting out any distortion / completely silent track / phrase removed completely
Note: If vocal is not soloed or the metronome is switched on, assess what can be heard clearly up to max 2.	

<table>
<tr><th>Question Number</th><th>Question</th><th>Mark</th></tr>
<tr><td>3(e)</td><td>Remove headphone spill and other intrusive noise throughout the vocal track. You must leave the repeated vocal intact in bars 18-19.
Acceptable Answers
Listen to all of task 2.
A gate would remove all headphone spill though it may still be faintly audible. Breaths may be removed but this is not required.
Paper rustling that a gate would not remove at 1:06, 1:24.
Don’t assess the second phrase of the vocal which was assessed in 3(d), however “clipped” (0:08) should be removed.
<table>
<tr><th>Mark</th><th>Preparation of vocal track — removing unwanted noises</th></tr>
<tr><td>4</td><td>The vocal is intact with no obvious unwanted noises present.</td></tr>
<tr><td>3</td><td>The vocal is intact but with some unwanted noises/clicks still present (less than a semiquaver) because of false triggering</td></tr>
<tr><td>2</td><td>Multiple parts of vocal have been cut off throughout (possibly by a gate threshold being set too high)
OR
‘Clipped’ is removed with less than a crotchet of paper rustling, and spill may remain.</td></tr>
<tr><td>1</td><td>There is more than one crotchet of the vocal cut out
OR
There is more than one crotchet of ‘clipped’ or paper rustling left in
OR
Spill removed using EQ.</td></tr>
<tr><td>0</td><td>No attempt at cutting out any noise / completely silent track</td></tr>
<tr><td colspan="2">Note:
If vocal is not soloed then max. 1.</td></tr>
</table></td><td>4</td></tr>
</table>

Question Number	Question	Mark
4a	Describe how you would mic up a standard drum kit for a rock band in a contemporary recording. Explain any decisions you make. How does this compare with mid-1960s drum recording technique?	16
	Acceptable Answers	
	In this mark scheme, italics mean that the mark should not be credited multiple times. Underlined technical terms must be spelt correctly Tune drum kit (1). Dampen skins with gaffer tape / gels / cushions (1) Remove unused parts of drum kit / rattles (1). Screens to reduce spill (1). Credit any discussion of room acoustic (1). Place mics where they won't be hit (1). Multiple mics used for better control of mixing / EQ / compression / processing / balance etc (1) Directional microphones e.g. cardioid / figure of eight (1) to prevent spill (1). Closer = less spill (1) and proximity effect (1) correct reference to low frequencies (1) Further / higher = more natural / picks up sound of whole drum / more reverb (1) Any correct discussion of phase/polarity (1) **Kick / bass drum** *Large diaphragm (1) to pick up low frequencies (1).* *Dynamic / D112 / D6 / PG52 / beta 52 etc (1) high SPL / loud (1) to pick up low frequencies (1).* Inside (1) less spill (1). Up to 10 inches / 25cm / close from (beater) skin (1). Additional mic placed in front / outside of kick drum (1) e.g. woofer speaker cone (1) for sub-bass (1) *Condenser / capacitor (1)* Modify the beater / glue coin/credit card to the skin / clicky beater / upper mids to cut through the mix (1) **Snare & toms** *Clip-on mics (1)* *Dynamic / SM57 / D40 / i5 (1) high SPL / loud (1) robust (in case it's hit) (1).* *Condenser / capacitor / C1000 / C414 / C451 (1) for brightness / HF (1) pad (1).* *Up to 6 inches / 15cm (1).* Snare drum mic should be as far away as possible from hi-hat to prevent spill (1). Snare bottom mic (1) to pick up the rattle / snare / wires (1). Beware of spill from kick drum (1).	

(Floor) tom
Large diaphragm (1) to pick up low frequencies (1).
Dynamic / D112 / PG52 / MD421 etc (1) high SPL / loud (1) to pick up low frequencies (1).

Hi-hat
Not always needed in mix because of overheads / snare spill / importance of hi-hat in the song (1).
Small diaphragm (not 'pencil') (1) to pick up high frequencies (1).
Condenser / capacitor / C1000 / NT5 / 414 (1) to pick up high frequencies (1).
Pad (1) to prevent distortion (1).
2-6 inches / 5-15cm (1)
Above hi-hat to prevent air blasting (1).

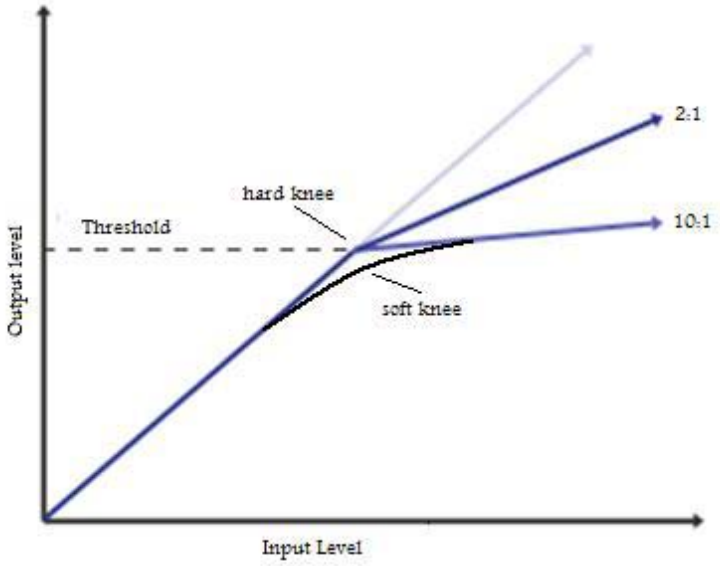
Overheads (1)
Mostly to pick up cymbals / overall picture of kit / more reverb than the spot mics (1). *Stereo / left and right (1).*
Any ref to additional spot mic cymbals (1)
Stereo track in DAW / 1-2 / 3-4 pairs (1).
Condenser / ribbon / C1000 / NT5 / 414 (1) to pick up high frequencies (1).
Pad (1) to prevent distortion (1).
1-4ft / 30cm-120cm from cymbals / snare (1).
Equal distance from snare (1) so snare centre (of stereo picture) (1).
Spaced pair (1) gives wider picture (1).
X-Y / co-incident pair / Blumlein / ORTF (1), middle and side / M-S (1)
reduces hole in the middle / natural stereo [not just "stereo"] (1).
Omni / figure of 8 (1).
Glyn Johns (1) mic overhead and mic to side of kit (1)

Large diaphragm condenser/LDC popular for heavier music (1) - presence peak in high mid range accentuates snare (1)
Small diaphragm condenser/SDC (1) for fast transient response (1)
Balance between drums and cymbals improves with height / moving mics around side or behind drummer (1)

Room
2 mics / stereo (1)
Spaced pair (1)
Condenser / ribbon / PZM / boundary (1) sensitive (1) low SPL / quiet (1).
Omni / figure of 8 (1).
More than 6 ft / pointing away from drum kit (1) to reduce dry signal / give lots of reverb (1).

Additional mics
Extra mic for special effects / more compression / distortion (1)

	1960s drum recording Mono (1) Fewer mics / not spot mic'ed/close mic'ed / any valid description of 60s mic'ing (1) Further away / bigger room / brighter room / more ambience / reverb / more spill (1). Indistinct kick drum / poor balance (1) Less LF / HF (1). Fewer tracks (1) Often bounced/combined with other tracks (1) Ribbons more common (1). Valve mics more common (1)	

Question Number	Question	Mark
4b	Figure 1 shows a valve compressor. Many of the controls are similar to those of a software plug-in. Explain the function of the controls and specifications that can be seen in the picture.	16
	Acceptable Answers	
	Underlined technical terms must be spelt correctly All comments must relate to the correct knob/socket. **GENERAL DESCRIPTION OF COMPRESSOR** Reduces dynamic range/automatic volume control/evens out volumes (1)  Output AND Input correctly labeled (1) Threshold correctly labeled (1) Ratio correctly labeled (1) (*allow examples, e.g. 3:1*) Hard knee / Soft knee correctly labeled (1) **INSTRUMENT** Jack / TS / tip-sleeve (1) usually used for instruments such as electric guitar/synths / DI (1). **INPUT** Pre-amp (1). MIC 48V: Phantom power (1) used to supply power to condenser microphones (1) or DI boxes (1). MIC: Used for dynamic / ribbon (1). Credit any reference to impedance / resistance / sensitivity (1)	

	Gain knob (1) Turn down to prevent distortion / distorted if too loud (1) Reduce noise / good signal to noise ratio (1) Drives valve: saturation / soft clipping / harmonic distortion (1); colours the signal / warm (1) gain structure (1) HPF / high pass filter / low cut filter / rumble filter (1) **COMPRESSOR CONTROLS** **ATTACK:** time taken for the compressor to reduce the gain / start compressing (1). A longer attack time preserves the transients of the signal / A shorter attack time reduces the transients of the signal (1). **RELEASE:** time taken for compressor to stop working (*after* signal falls below the threshold) (1). Long release used to reduce pumping / make compression sound more natural (1). Affects sustain (1). **THRESHOLD:** Sounds **above** threshold are compressed / compresses **louder** sounds (1). Lower threshold gives more compression (1). **RATIO:** Amount of compression (1). Gives the ratio between the input signal and the output signal / specific example e.g. "2:1. For every 2 decibels (above threshold) only 1 decibel would be output" (allow ratio other way around) (1). A higher ratio gives more compression (1). Infinite / very high ratio / 30:1 gives limiting (1). **GAIN MAKE-UP:** Used *after* compression (1) to compensate the compressor reducing the gain / level (1). The amount of gain (make-up) required can be established by looking at the gain reduction meter / by ear (1). **COMP ON:** Bypass / in-out / wet-dry / a-b / compare the effect of the compressor before and after compression (1). **KNEE:** controls the bend in the response curve (1). A soft knee reduces the audible change from uncompressed to compressed / gradual onset of compression (around the threshold) (1). **GATE** Knob = threshold (1) Signal below the threshold (1) cuts out noise / quiet sounds (1). **METER** Switches between different metering modes (1) Volume unit meter (1) (not VU) Gain reduction (1). *[No credit for input/output]*	

	OUTPUT Master / after processing signal (1) **STEREO LINK** Links two mono compressors together to make one stereo compressor (1). Same gain reduction applied to both channels (1). Prevents image shift (1). **REAR** XLR (1) locking tabs (1) Line (1) for synthesiser / allow electric piano / credit any other line signal (1) not 'guitar/bass' Balanced signals have less noise / better signal to noise ratio (1). Accept any explanation of how a balanced signal works: two opposite polarity signals / cancelling out noise / destructive interference (1). Jack / TS / tip-sleeve *[don't double credit]* Credit any reference to impedance / resistance / sensitivity (1) *[don't double credit]* Side chain (1) allows compression amount to be controlled by external / different signal (1). Accept any valid example e.g. de-esser / pumping synths with kick drum (1). Kettle socket (1) IEC /C14/C13 (1). Internal power supply is more reliable than external power adaptor (1).	

Question Number	Question	Mark
5(a)	Compress the **vocals**. • Ensure that the quieter sections are not masked by other instruments. • Ensure that the peaks do not jump out of the mix.	**3**
	Acceptable Answers	

	Management & control of the vocal dynamics This is best assessed in the final chorus where the word "believe" is recorded quieter.
3	All of the vocal has a more even dynamic range, notably the word 'believe' in the final chorus. Overall, the dynamic range is similar to 'task 3 mixed'.
2	All of the vocal has a more even dynamic range, notably the word 'believe' in the final chorus. Overall, the dynamic range is similar to 'task 3 mixed', but: Transients >= Q on "fake" at 0:18 and "faking" at 1:22 (attack time too long on compressor)
1	The vocals have audible compression > P and the dynamic range is reduced, however some parts of the vocal are partially masked / uneven level OR Clearly audible volume automation
0	No compression can be clearly identified on the vocal; compression <= P. OR No mix present on CD.

Question Number	Question	Mark
5(b)	EQ the **bass guitar**. • Create a **bright** tone suitable for the 1980s style of playing.	3
	Acceptable Answers	

	Management & control of the bass EQ This is best assessed at 0:38 and 1:02 where the bass is soloed
3	The bass is of similar or greater brightness to H, without extreme frequency exaggeration or restriction.
2	The bass is obviously brighter, but not as bright as H.
1	EQ applied with extreme settings.
0	No UM/HF boost EQ can be identified on bass.
	Max 1 if EQ affects other tracks except if already assessed in 3d/e.

Question Number	Question	Mark
5(c)	Listen to the effect on the vocal in bars 18-19. Recreate the same effect in bars 20-21.	6
	Acceptable Answers	
	(i) Delay (1) Two repeats (1) Repeats are correct timing (within a semiquaver) and correct words (1) Max 1 for (i) if delay affects other tracks or other sections of the vocal / wrong effect on any track / intrusive reverb on any track. (ii) Panning is used in some way on the vocal (1) First repeat hard left AND the dry signal is centre (1) Second repeat hard right AND the dry signal is centre (1) Max 2 for (ii) shallow panning / moving Max 1 for (ii) if panning affects other tracks / wrong panning on any track. Max 1 for (c) if bars 18-19 are copied and pasted into 20-21	

Question Number	Question	Mark
5(d)	Balance the mix. • Ensure that all of the tracks can be heard clearly.	**3**
	Acceptable Answers	
	Balance and blend On CD ROM: • Synthesiser loudest • Vocals mid volume • Bass quietest	
3	Balanced and blended across all parts of the mix. Vocals sit on top of mix.	
2	Most tracks are balanced with some masking. A few misjudgements, e.g. synth louder than the vocal; or drums quieter than synth	
1	Balanced so that one track is barely audible. E.g. bass are <= G; delay vocals quiet. OR Not all tracks present/additional tracks.	
0	No mix on CD OR Only a single track present.	

<table>
<tr><th>Question Number</th><th>Question</th><th>Mark</th></tr>
<tr><td>5(e)</td><td>Produce a final stereo mix.
Ensure that the mix output is at as high a level as possible.
It should be free from distortion.
Do not limit or compress the mix output.
Ensure that the beginning and the end of the music are not cut off.
Ensure that silences at the beginning and end do not exceed one second.
Acceptable Answers<table><tr><th></th><th>Presentation of mix</th></tr><tr><td>3</td><td>Beginning and end of mix does not cut out music or reverb/cymbal tails.
The beginning has less than one second of silence before the music starts. The mix output should be near normalised with no distortion.</td></tr><tr><td>2</td><td>Beginning and end of mix do not cut out. The beginning and/or end have a silence of greater than one second.
OR
The mix output is too low OR there is some slight distortion.</td></tr><tr><td>1</td><td>Obviously chopped start or ending including any reverb/cymbal tails.
OR
The mix output is unacceptably low or too high (distorted).
OR
Excessive use of mix compression causes pumping
OR
Metronome has not been turned off.
OR
Any part is noticeably out of sync / out of tune
IGNORE previously assessed work:
Vocal timing in second phrase & bars 20-21
Drum rhythm</td></tr><tr><td>0</td><td>No mix present on CD.</td></tr></table></td><td>3</td></tr>
</table>

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