Mark Scheme (Results)

Summer 2023

Pearson Edexcel GCE
Music Technology (9MT0)
Paper 04: Producing and Analysing

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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.

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Question Number	Answer	Mark
1(a)	**C** 1/16 A, B, D are incorrect because the smallest note value is 1/16.	1

Question Number	Answer	Mark
1(b)	**B** Hi-hat A, C, D are incorrect because the high hat has the most high frequency content.	1

Question Number	Answer	Mark
1(c)	1 mark for each correct rhythm: • open hi-hat on G# • closed hi-hat on F#, beats 43:1 and 43:3 (don't assess areas in red boxes) • 2 snares/claps on 43:3 and no extra snares/claps • 4 snares/claps on 43:4 • kick on C 	5

Question Number	Answer	Mark
2(a)	Accept any of the below: • 7936 • 16128 • 126 • 62	1

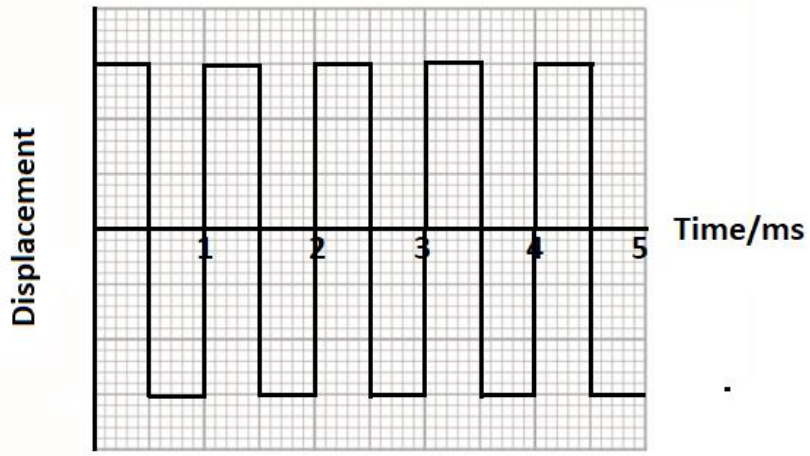
Question Number	Answer	Mark
2(b)	Two (data) bytes (instead of one / to store the value) (1) 14 bits (1) Allow “16 bits” (1) Allow “more bits” (1) [not “bit-rate”] Allow “more bytes” (1) NOT “8 bits”	1

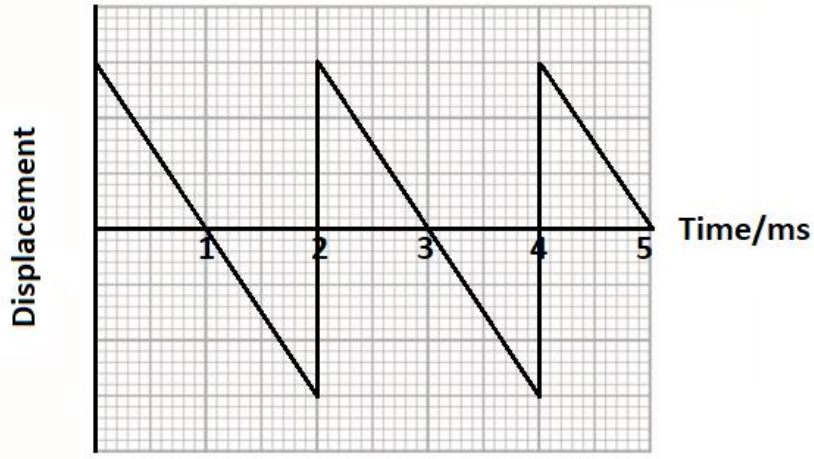
Question Number	Answer	Mark
2(c)	<table><tr><th>Velocity in decimal</th><th>Velocity in binary</th></tr><tr><td>22 (1)</td><td>10110 (1)</td></tr><tr><td>103 (1)</td><td>1100111 (1)</td></tr></table> Allow preceding 0s.	4

<table>
<tr><th>Question Number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>2(d)</td><td>
“synth fills example.wav” was bars 33-39.
<table>
<tr><td>“Synth fills” timbre</td></tr>
<tr><td>Correct octave and pitches throughout (1)
Ignore first note which could have some pitchbend not reset.
Allow +-2 semitones because pitchbend would affect tuning.</td></tr>
<tr><td>Square wave (1). Allow saw or pulse..</td></tr>
<tr><td>Pitch bend range is 12 semitones (1)
Award 0 if there is other pitch bending/envelope.</td></tr>
<tr><td>Amplitude envelope is correct (1):
A=0, D=max, S=max, R=enough release so that the drop in octave is heard in the release phase, on the on beat.</td></tr>
<tr><td>
<table>
<tr><th>Mark</th><th>Velocity sensitive filtering</th></tr>
<tr><td>2</td><td>Matching LPF with no resonance in bars 30-33
AND
Bright with no filtering and no resonance in bars 39-44.
Brighter than J.</td></tr>
<tr><td>1</td><td>Bars 39-44 are brighter than bars 30-33 in some way more than candidate I.</td></tr>
<tr><td>0</td><td>There is no difference in the filtering between each section
OR
Bars 39-44 are less bright than bars 30-33</td></tr>
</table>
</td></tr>
<tr><td>Light stereo chorus (1).
Award 0 if any FX are added other than chorus</td></tr>
<tr><td>If synth fills part is not soloed, has effects other than chorus, or the metronome is switched on, assess what can be heard clearly.

If instrument is not a synthesiser (e.g. bass guitar/piano) then award (i) octave and (iii) pitch bend only.

If a candidate has only submitted bars 33-39 then award 0 for all of question 2. Insufficient work has been submitted in q2 to assess.</td></tr>
<tr><td></td></tr>
</table>
</td><td>7</td></tr>
</table>

Question Number	Answer	Mark
2(e)(i)	 Square wave (1) Period of 1ms (1) Accept DC offset Accept different amplitude	2

Question Number	Answer	Mark
2(e)(ii)	 Saw wave (1) (allow inverted saw wave) Period of 2ms (1) [allow error carried forward, i.e. one octave lower than graph shown in 2(e)(i)] Accept DC offset Accept different amplitude	2

Question Number	Answer	Mark
3(a)(i)	Flanger (1) Allow phaser (1) NOT chorus	1

Question Number	Answer	Mark
3(a)(ii)	Feedback (1) Mix / dry/wet (1) Allow depth/intensity (1) If more than 2 answers given, mark correct answer then for every extra answer -1.	2

Question Number	Answer	Mark
3(b)	**B** 4 semitones A is incorrect because it's not a semitone pitch bend C is incorrect because it's not a fifth pitch bend D is incorrect because it's not an octave pitch bend	1

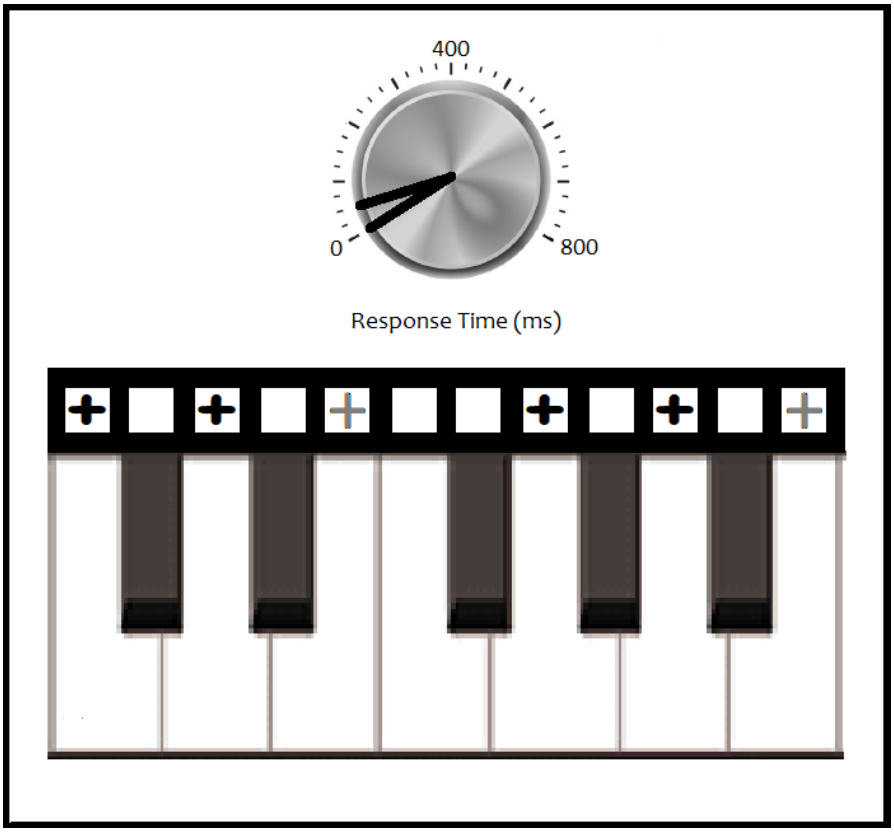
Question Number	Answer	Mark
3(c)	Longer attack (1) Longer hold (1) Longer decay (1) Higher sustain (1) Allow: Zero release (1) not "quick release"	2

Question Number	Answer	Mark
3(d)	**Sample editing**: Volume of given notes and sampled notes is matched (1) Notes are legato (1) Sample has no start/end clicks, stereo with no other processing, and is truncated so that it plays in time (1) **Pitch and rhythm**: 38:2:1 pitch and rhythm correct: A (1) 38:2:3 pitch and rhythm correct: G# (1) 38:3 pitches and rhythm correct: A G# (1) 38:4:1 pitch and rhythm correct: G (1) 38:4:3 pitch and rhythm correct: G# (1) 42 pitch and rhythm correct / same as bar 38 (error carried forward) (1) Max 4 for pitch and rhythm if in the wrong octave. If all notes are the same, then only assess sample editing. If no marks are awarded above, award 1 mark if there has been an unsuccessful attempt at using “chorus synth incomplete.wav” to duplicate the bassline. If the part is not soloed or the metronome is left on, then: • Volume can only be assessed if clearly audible • Legato can only be assessed if clearly audible • Sample clicks etc is not assessable. Award 0 marks if candidate has used a MIDI timbre to recreate the chorus synth.	9

Question Number	Answer	Mark
3(e)(i)	-15 (1) NOT 15 +15	1

Question Number	Answer	Mark
3(e)(ii)	Logarithmic scale (1) Non-linear (1) A more accurate scale is required around 0dB (1)	1

Question Number	Answer	Mark
3(e)(iii)	RMS is the average volume (1) allow “perceived volume” Transients/peaks will be missed (1) RMS doesn’t act fast enough (1) RMS levels are generally lower than peak levels (1) Peak (metering) should be used / RMS metering isn’t peak metering (1) Max 1 if a valid above point is made, but there is any discussion about compression/limiting.	2

Question Number	Answer	Mark
4(a)	 (i) 0-50ms (1) (ii) C (1), D (1), G (1), A (1) If more than 4 pitches given, mark correct pitches then for every extra pitch -1.	5

Question Number	Answer	Mark
4(b)	Audio editing: Vocal syllables are correct on all notes (1). Correct timing / samples are correctly truncated (1) No clicks, glitches, extreme formant/octave changes, or volume/panning changes (1). Ignore slight chorus or flanging. Pitch and rhythm: 1 mark for each correct pitch and rhythm in bar 39: A (1) F (1) Award 1 mark if candidate created a backing vocal with correct pitch and rhythm for bar 39 using other samples/sounds. Award max 1 mark if candidate has not attempted any re-pitching but created a discernibly different backing vocal, e.g. with EQ and/or ADTing. If the part is not soloed or the metronome is left on, mark what is clearly audible but clicks/glitches etc is not assessable.	5

<table>
<tr><th>Question Number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>4(c)</td><td>1 mark for each feature to a maximum of 4 (AO3). 1 mark for each analytic point (AO4).

Allow the AO4 mark if the AO3 has been mis-named, e.g. if the candidate thinks the polar response is called cardioid, they can still access the “would capture more noise” mark.

<table>
<tr><th>AO3</th><th>AO4</th></tr>
<tr><td>Polar response / pick-up pattern / polar pattern (1)
Omni selected (1)</td><td>Cardioid would be most suitable (1)
Omni would capture more reverb/noise / cardioid would capture less reverb/noise (1)
Figure of 8 would capture more noise/spill/reverb than cardioid, but less than omni (1).
With pop vocals, it is better to capture a dry vocal, then add effects afterwards (1) for more control in the mix (1).</td></tr>
<tr><td>High pass filter / low cut filter / rumble filter (1)
Switched off (1)
Hz (1)</td><td>No rumble/low frequency noise would be removed / using HPF would remove rumble/low frequency noise (1).
Using HPF would reduce proximity effect (1).
Vocal tone would not be affected by use of the HPF (1).
Helps reduce plosives (1).
80Hz would remove more rumble/noise than 40Hz (1).</td></tr>
<tr><td>Pad/attenuator/ sensitivity (1)
dB (1)</td><td>Vocals not loud/not high SPL to require a pad (1).
-10dB would give low signal / more noise (1).
0 dB would achieve better gain structure (1).</td></tr>
</table>
</td><td>8</td></tr>
</table>

<table>
<tr><th>Question Number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>5(a)</td><td>
<table>
<tr><th>Mark</th><th>Removing noise between the words “stop” and “Let’s” in vocal at bars 31-32.</th></tr>
<tr><td>2</td><td>Breath and lip noise in bars 31-32 have been removed without cutting any of the words and no glitches. Similar to ‘MS q5.wav’</td></tr>
<tr><td>1</td><td>Some noise is cut but:
Audible noise or glitches in bars 31-32.
OR
Parts of vocal cut out
OR
Partially masked with extra effects.</td></tr>
<tr><td>0</td><td>No attempt to cut out noise.
OR
The vocal track is not loud enough to assess, or other parts are out of sync so mask the vocal track.</td></tr>
</table>
</td><td>2</td></tr>
</table>

<table>
<tr><th>Question Number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>5(b)</td><td>
<table>
<tr><th></th><th>Riser panning automation in bar 25.</th></tr>
<tr><td>3</td><td>L – R smoothly as directed</td></tr>
<tr><td>2</td><td>R – L
OR
C – R
OR
L – C
OR
Not hard panned.
OR
Glitch / click on the edit</td></tr>
<tr><td>1</td><td>Erratic panning
AND/OR
Riser panned in a single position other than centre.
AND/OR
Drums do not reset to centre in bar 27.</td></tr>
<tr><td>0</td><td>There is no audible panning automation on the riser.
OR
No mix present on CD.</td></tr>
</table>
</td><td>3</td></tr>
</table>

Question Number	Answer	Mark
5(c)	**Chorus in bars 13:4 - 45. Best heard in bar 32 where it is soloed.** Chorus/detune (1) Stereo chorus/detune effect (1) Effect similar in depth/rate/mix (1) Max 2 if there is a glitch at 13:4 / not present throughout / extra chorus present 9-13 Max 1 if chorus is only present until bar 25, i.e. 2nd verse copy and pasted from 1st verse. Max 1 if chorus affects other tracks.	3

Question Number	Answer	Mark
5(d)	**Delay in bar 23.** Mono delay (1) minim delay time (1) Send amount ≈-6dB and feedback≈35% (1) [should fill the gap before "now you've got me…" and must wet<dry] Max 2 if glitch or delay affects other words / present throughout. Max 1 if delay affects other tracks.	3

Question Number	Answer	Mark
5(e)		3

	Vocal gating in bars 36-37.
3	Keyed gate: Vocal plays simultaneously with the hi-hat and clap with every hit. Allow long release.
2	Keyed gate: Vocal plays simultaneously with the hi-hat and clap but some hits are missing (high threshold). OR The rhythm is correct, but glitches OR Audible join when gate is bypassed at 36:1 or 37:4 OR Part of the phrase is not gated
1	Keyed gate: BUT Other bars are affected OR Incorrect rhythm, e.g. the end of "show" is triggered by the riser
0	There is no audible evidence of keyed gating on the vocal. No mix present on CD.

Question Number	Answer	Mark
5(f)	**Reverb in bars 2-5.** Reverb is added anywhere in bars 2-5 (1) There is some kind of increasing reverb effect throughout bars 2-5 (1) The reverb **time is increasing** throughout bars 2-5 (1) Short reverb time on first phrase, second and third phrase reverb **time increases** to fill the gaps until next vocal (1) Max 2 if reverb affects other bars/parts or glitches introduced	4

Question Number	Answer	Mark
5(g)	Original audio file volumes: • bass medium • vocals medium • chorus synth loud • drums quiet • synth fills are MIDI **Balance and blend** 3 – Balanced and blended across all parts of the mix. Vocals sit on top of mix and drums are driving the mix. 2 – Most tracks are balanced with some masking. A few misjudgements, e.g. drums under / chorus synth over 1 – Balanced so that one track is barely audible. e.g. drums <= 'MS q5 unbalanced unmixed' OR Balanced so that one track is too dominant, e.g. chorus synth masking other tracks OR Not all of a track present affecting balance OR Additional tracks OR Erratic volume changes. 0 – No mix on CD OR Not all tracks present Ignore previously assessed work e.g. vocal gating, chorus synth missing bars, incorrect volume or missing backing vocal	3

Question Number	Answer	Mark
5(h)		3

	Presentation of mix
3	Beginning and end of mix does not cut out music or tails. The beginning and end have less than 1 second of silence. The mix output is near normalised with no distortion.
2	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 is compressed OR there is some slight distortion OR is louder than “MS q5 mixed”. OR Stereo tracks have been made mono OR Cut chorus synth/bass tail
1	Obviously chopped start or ending (not including 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 / missing OR Any additional intrusive processing / EQ / panning IGNORE previously assessed work: e.g. synth fills tuning, chorus synth pitches
0	No mix present on CD.

Question Number	Answer	Mark
6	**AO3 (5 marks)/AO4 (15 marks)** **Marking instructions** Markers must apply the descriptors in line with the general marking guidance and the qualities outlined in the levels-based mark scheme below. Responses that demonstrate only AO3 without any AO4 should be awarded marks as follows: • Level 1 AO3 performance: 1 mark • Level 2 AO3 performance: 2 marks • Level 3 AO3 performance: 3 marks • Level 4 AO3 performance: 4 marks • Level 5 AO3 performance: 5 marks **Indicative content guidance** Do not double credit repeats shown in italics. The indicative content below is not prescriptive and candidates are not required to include all of it. Other relevant material not suggested below must also be credited. Relevant points may include:	20

AO3	AO4
Compressor Reduces dynamic range / increases average volume.	Placing compression after EQ could help control sibilance.
Threshold Sound above threshold is compressed.	*Low threshold gives a lot of compression/heavy compression.* *Distorted guitars have a narrow dynamic range. Unprocessed vocals have a wide dynamic range.* *Helps them sit in the mix.* Threshold setting will depend on the input level.
Ratio Amount of compression.	*High ratio gives a lot of compression/heavy compression.* (Almost a) limiter. *Distorted guitars have a narrow dynamic range. Unprocessed vocals have a wide dynamic range.* *Helps them sit in the mix.*
Make up Gain. Increases volume after compression. Compensates for reduction of gain.	Make up gain should be increased. Output would be quieter than input.
Attack Time taken for compression to reduce gain after input has exceeded the threshold.	*Fast attack.* Award any valid comment about transients. Not too fast that it could cause clicks.
Release Time taken for compression to stop after input has fallen back below the threshold.	*Fast release.* Slow enough to reduce pumping / natural sound. Fast enough to prevent vocal level dipping / vocal tails becoming masked.
EQ Affects volume of different frequencies.	EQ after compression can correct changes in tone caused by compression.
Low *shelf*.	Cut off frequency is high so will boost low mids too. Warm up vocals. Could sound muddy in the mix. Frequency range could be congested with bass guitar. Rumble would be increased. Plosives would be increased. Proximity effect would be increased. Rumble/plosives/proximity effect will be made worse by the heavy compression. Would better to cut low frequencies.

Mid Semi-parametric. No bandwidth/Q control.	Presence peak. *Adds clarity/brightness.* *Bring vocals forward in mix.* *Could increase sibilance/breaths. De-esser would be needed to reduce sibilance.*
High *shelf.*	Airband boost. *Adds clarity/brightness.* *Bring vocals forward in mix.* *Could increase sibilance/breaths. De-esser would be needed to reduce sibilance.*
All EQ	All EQ bands are boosted so overall would be louder. This could cause peaking/distortion.
Delay	Adds (a sense of) ambience. Adds layer of rhythm. Would be better as aux effect than insert. (Dynamics and EQ) processing before adding effects. If delay was before compression, the delays would be louder.
Delay time	Delay times <u>slightly</u> offset. Increases stereo width. 1/8 note / quaver delay. In time with song.
High cut LPF.	High frequencies are cut. Delay signal will be duller/muffled. Analogue/tape. Pushes delays back in the mix. Improves intelligibility of lead vocal.
Feedback The amount of signal fed back into the delay loop. Allow number of repeats.	Feedback high. Too many audible repeats. Will blur the mix / meaning of the vocals. 15-40% is more suitable.
Mix Controls the balance between dry and wet/delay signal. Dry Wet	Overall, the volume of the channel will be higher so could peak/distort. All of the dry signal is present. Delay is behind the dry signal in the mix. If delay was on a send it would be set to 0% dry and 100% wet.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–4	• Demonstrates limited knowledge and understanding of production techniques/technology used, some of which may be misunderstood or confused. (AO3) • Shows limited analysis and deconstruction of production techniques/technology used with little attempt at chains of reasoning. (AO4) • Makes limited evaluative and/or critical judgements about the production techniques/technology used. (AO4) • Makes an unsupported or generic conclusion, drawn from an argument that is unbalanced or lacks coherence. (AO4)
Level 2	5–8	• Demonstrates knowledge and understanding of production techniques/technology used, which are occasionally relevant but may include some inaccuracies. (AO3) • Shows some analysis and deconstruction of production techniques/technology used with simplistic chains of reasoning. (AO4) • Makes some evaluative and/or critical judgements about the production techniques/technology used. (AO4) • Comes to a conclusion partially supported by an unbalanced argument with limited coherence. (AO4)
Level 3	9–12	• Demonstrates clear knowledge and understanding of production techniques/technology used, which are mostly relevant and accurate. (AO3) • Shows clear analysis and deconstruction of production techniques/technology used with competent chains of reasoning. (AO4) • Makes clear evaluative and critical judgements about the production techniques/technology used. (AO4) • Comes to a conclusion generally supported by an argument that may be unbalanced or partially coherent. (AO4)
Level 4	13–16	• Demonstrates detailed knowledge and understanding of production techniques/technology used, which are relevant and accurate. (AO3) • Shows detailed and accurate analysis and deconstruction of production techniques/technology used, with logical chains of reasoning on occasion. (AO4) • Makes detailed and valid evaluative and critical judgements about the production techniques/technology used. (AO4) • Comes to a conclusion, largely supported by a balanced argument. (AO4)
Level 5	17–20	• Demonstrates sophisticated and accurate knowledge and understanding of production techniques/technology used throughout. (AO3) • Shows sophisticated and accurate analysis throughout, and deconstructs production techniques/technology used with logical chains of reasoning throughout. (AO4) • Makes sophisticated and valid evaluative and critical judgements about the production techniques/technology used. (AO4) • Comes to a rational, substantiated conclusion, fully supported by a balanced argument that is drawn together coherently. (AO4)