



# **NCFE Level 3 Applied General Certificate in Music Technology (601/6779/8)**

Assessment date: March 2020

## **Mark Scheme**

This mark scheme has been written by the Assessment Writer and refined, alongside the relevant questions, by a panel of subject experts through the external assessment writing process and at standardisation meetings.

The purpose of this mark scheme is to give you:

- examples and criteria of the types of response expected from a learner
- information on how individual marks are to be awarded.

## Marking guidelines

### *General guidelines*

You must apply the following marking guidelines to all marking undertaken throughout the marking period. This is to ensure fairness to all learners, who must receive the same treatment. You must mark the first learner in exactly the same way as you mark the last.

- The mark scheme must be referred to throughout the marking period and applied consistently. Do not change your approach to marking once you have been standardised.
- Reward learners positively, giving credit for what they have shown rather than penalising for what they might have omitted.
- Utilise the whole mark range and always award full marks when the response merits them.
- Be prepared to award zero marks if the learner's response has no creditworthy material.
- Do not credit irrelevant material that does not answer the question, no matter how impressive the response might be.
- The marks awarded for each response should be clearly and legibly recorded in the grid on the front of the question paper.
- If you are in any doubt about the application of the mark scheme, you must consult with a senior Examiner.

### *Guidelines for using level of response marking grids*

Level of response marking grids have been designed to award a learner's response holistically and should follow a best-fit approach. The grids are broken down into levels, with each level having an associated descriptor indicating the performance at that level. You should determine the level before determining the mark.

When determining a level, you should use a bottom-up approach. If the response meets all the descriptors in the lowest level, you should move to the next one, and so on, until the response matches the level descriptor. Remember to look at the overall quality of the response and reward learners positively rather than focussing on small omissions. If the response covers aspects at different levels, you should use a best-fit approach at this stage, and use the available marks within the level to credit the response appropriately.

When determining a mark, your decision should be based on the quality of the response in relation to the descriptors. Standardisation materials, marked by senior Examiners, will help

you with determining a mark. You will be able to use exemplar learner responses to compare to a live response, to decide if it is the same, better or worse.

You are reminded that any indicative content provided is there as a guide, and therefore you must credit any other suitable responses a learner may produce. It is not a requirement either, that learners must cover all of the indicative content to be awarded full marks.

Q	Marking guidance	Total marks
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**Section 1**

**Total for this section: 20 marks**

1	<p><b>Identify the MIDI processing which has been applied to the synthesiser melody at 00:37s in Audio File Section 1.</b></p> <p>Answer: D (Velocity)</p>	1
2	<p><b>The vocal in Audio File Section 1 has reverb applied to it. The reverb effects plugin is being manipulated by automation.</b></p> <p><b>Identify two parameters which are being audibly adjusted by automation between 00:07s and 00:14s.</b></p> <p>Award 1 mark for each correct parameter.</p> <ol style="list-style-type: none"> <li>1. Wet</li> <li>2. Size</li> </ol> <p>Accept other reasonable responses (e.g. reverb amount, decay)</p>	2
3	<p><b>Audio File Section 1 has been recorded using the following settings:</b></p> <p><b>Sample Rate: 96kHz</b> <b>Bit-depth: 24 bit</b></p> <ol style="list-style-type: none"> <li><b>a) Explain the function and effect of sample rate settings when you record audio files.</b></li> <li><b>b) Explain the function and effect of bit-depth settings when you record audio files.</b></li> </ol> <p>Award 1 mark for function of term. Award 1 mark for correct expansion. (Maximum two marks for each term).</p> <p>Sample rate is the frequency at which audio samples are taken (1). This needs to be set high enough to accurately record the frequency of the sounds being captured (1).</p> <p>Bit-depth is the number of bits of information in each sample (1). A higher bit-depth corresponds to a greater audio resolution (accept dynamic range) (1).</p> <p>Accept other reasonable responses.</p>	4

<p><b>4</b></p>	<p><b>The producer wants to extend the vocal note heard at 00:51s of Audio File Section 1 so that it lasts until the end of the song.</b></p> <p><b>Identify one audio editing tool which could be used to extend the vocal.</b></p> <p>Answer: Time manipulation</p> <p>Award other reasonable exemplified responses.</p>	<p><b>1</b></p>
<p><b>5</b></p>	<p><b>At 00:44s of Audio File Section 1 a sampled bass guitar can be heard.</b></p> <p><b>Explain one musical issue caused by the preparation of audio or sample editing which is audible in the bass guitar part.</b></p> <p>Bass notes have not been fully captured when recorded (1) this leads to notes being audibly cut off before the note should finish (1).</p> <p>Bass guitar has been recorded out of tune (1) which has negatively impacted upon the musical outcome (1) (or doesn't 'sit' with the rest of the track).</p> <p>The use of one shot (1) has led to notes clashing when the fast sections are performed (1).</p> <p>Too few samples have been used across the range (1) leading to unnatural tonal quality in upper registers (1)</p>	<p><b>2</b></p>

<b>6</b>	<p><b>Audio File Section 1 was recorded using a Digital Audio Workstation (DAW).</b></p> <p><b>Explain how advances in computer hardware, processing and memory have impacted upon how DAW technology is used to create music.</b></p>	<b>10</b>												
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2	3–4	<p>Inconsistent.</p> <p>Knowledge of concepts and functions of computer hardware, processing and memory is inconsistent. Relevant terminology and language is sometimes used, but is not always appropriate.</p> <p>Application of knowledge is inconsistent and there are errors/incorrect statements present in the response. The learner makes some links to impacts on DAW technology and its use, but these are not always correct.</p> <p>Analysis and evaluation is lacking in detail and conclusions are largely incorrect, or not supported by correct judgements.</p>
1	1–2	<p>Limited.</p> <p>Knowledge of concepts and functions of computer hardware, processing and memory is limited and largely inaccurate. Relevant terminology and language is not appropriately used throughout.</p> <p>Application of knowledge is limited to perhaps one specific area, or there are significant errors/incorrect statements present in the response. The learner makes some links to the application of DAW technology and its use, but these are mostly incorrect.</p> <p>Analysis and evaluation is limited in detail and conclusions are incorrect, or not supported by correct judgements.</p>
	0	Insufficient evidence for a mark to be awarded.
<p><b>Indicative content:</b></p> <p>Responses might consider the role each piece of hardware has within a DAW.</p>		

For example, CPU processor speed will be linked to the performance of processor intensive tasks such as audio effects plugins and software synthesisers. Links can be made to advances in CPU speed and how this has resulted in better quality plugins and plugin technology—for example, convolution reverb which would not have been possible on consumer systems <2000s. Multiple processor cores (dual, quad etc.) allow for greater sum-totals of tasks on singular items—for example a track with 8 active plugins will be handled by a single core freeing up other cores for additional tasks. Hyper-threading takes this further. CPU speed is also linked to numbers of tracks possible (specifically software instrument tracks that don't use audio files).

Memory: responses may cover RAM, magnetic storage, solid state media etc. RAM (Random Access Memory) should be linked to playback of audio files within a session and also the use of sampler instruments which rely on RAM to function. Overcoming limitations with faster and higher capacity RAM has led to increased track counts for audio file playback, increased sample rate/bit-depth of audio files (pushing digital audio standards higher), and increased quality of sampler instruments in terms of complexity (multiple samples, velocity layers, zones). Use of magnetic disks allowing large sessions to be loaded and archived, transition to SSD meaning that there is no delay in 'spin-up' and access speeds are faster. Sessions can be run directly from SSD due to speed, freeing up RAM for additional tasks.

Peripheral computer hardware advances: floppy disks, optical disks, Zip drives all leading to increased portability of work—initially just MIDI files and short audio samples, transitioning later to entire sessions and sample libraries being transferred using portable flash drives/SD cards etc. PCI Sound cards with MIDI/Audio connections allowing amateur and professionals quick access within the Personal Computer ecosystem, allowing for DAWs to work out of the box.

Responses could include portable equipment including laptops and tablet computers. Miniaturising of traditional computer components has allowed DAW technology to transition over to smaller platforms which are even more portable. As technology has improved some portable systems have become fully fledged DAWs in their own right.



**Section 2**

**Total for this section: 20 marks**

<p><b>7</b></p>	<p><b>Identify the time signature used throughout</b> Audio File Section 2</p> <p>Answer: B (3/4)</p>	<p><b>1</b></p>
<p><b>8</b></p>	<p><b>Instruments enter the mix at 00:07s in</b> Audio File Section 2.</p> <p><b>Identify the instrumental group to which these instruments belong.</b></p> <p>Award one mark for Percussion.</p>	<p><b>1</b></p>
<p><b>9</b></p>	<p><b>A group called the Flaming Fretboards have recently recorded an album. The album has been leaked online prior to its release.</b></p> <p><b>Explain two effects that this type of online copyright infringement has had on the music industry in the 21st Century.</b></p> <p>Award 1 mark for correct effect, award 1 mark for expansion. (Maximum two marks for each).</p> <p>Copyright infringement has resulted in people accessing music for free (1). This has led to decreased earnings for record companies/artists (1).</p> <p>The risk of copyright infringement with associated online releases (1) leading to artists utilising self-publishing options on physical media only (1).</p> <p>Copyright infringement led to legitimate companies (Apple, Spotify etc) entering the digital distribution market (1).</p> <p>Copyright infringement resulted in the BPI (British Phonographic Industry) lobbying the government (1) which led to legislation blocking access to pirate websites (1).</p> <p>Accept other valid responses.</p>	<p><b>4</b></p>

<b>10</b>	<p><b>The MIDI specification was published in 1983 and is an example of manufacturers working together to create a universally accepted protocol.</b></p> <p><b>Evaluate why the introduction of MIDI was beneficial to both musical instrument manufacturers and music creators.</b></p>	<b>10</b>												
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**Indicative content:**

Standardisation of communication between musical instruments enabling equipment to communicate with each other through a universal language. Manufacturers able to use standardised specification to ensure compatibility with other instruments and DAWs. Use of RPN/NRPN (registered and non-registered parameter numbers) enabled manufacturers to produce complex synthesisers with a vast array of functions knowing that they could be controlled through the MIDI specification. Specification covers range of operations including note data (note type, length, velocity etc). and pan and modulation. This allows for layering of sounds (multiple synthesisers slaved from one keyboard player), it also allowed for synchronisation of effects such as arpeggiators with drum machines. The net result musically was tighter electronic productions with more complex rhythmic elements. Popular music became much more electronic as a result; learners may reference artists or producers (Rick Astley / Stock, Aitken and Waterman for example).

Use of SysEx (System Exclusive) messages to transmit and recall set up information, making setting up of music sessions quicker and recallable. SysEx messages largely compatible across General MIDI (GM) sound modules/sequencers allowing greater compatibility between different manufacturers' devices.

Editing of MIDI information using sequencers, leading to quantised parts, fixed velocities and greater complexity of parts. This enabled musicians to create parts which may not be performable on real instruments. Performing in parts was no longer necessary, with step-input and programmable sequencing.

Use of MIDI loops which require very little data allow for large libraries of note passages which can be transferred to different instruments easily.

Effects units (guitar pedals, delay units etc) see expanded use through the implementation of MIDI specification, allowing multiple effects to be managed from a single device. This led to more complex instrumental sounds.

Manufacturers were able to utilise MIDI to expand on the functionality of instruments that previously would not have utilised device to device communication. Eg guitar amps with MIDI in/out for patching purposes, guitar multi-effects pedals that could trigger patch changes, tap tempo etc in other devices.

Manufacturers were able to expand manufacturing into a new product line: simple, soundless controllers (keyboards, drums triggers) that had the single function of sending MIDI control messages to sound modules/synthesisers/samplers etc.

11	<p><b>The Flaming Fretboards are planning to release their music on CD and via digital download. Their DAW has the following configurable settings for exporting stereo audio files:</b></p> <p><b>File Format</b> <b>Sample Rate</b> <b>Bit-depth</b></p> <p><b>a) Explain one appropriate setting for exporting stereo audio files for CD.</b> <b>b) Explain one appropriate setting for exporting stereo audio files for digital download.</b></p> <p>Award one mark for correct setting and award one mark for expansion up to a maximum of 4 marks.</p> <p><b>File Format:</b></p> <p>CD: .WAV, .AIF or .CDA.(1) CDs require uncompressed file formats (1)</p> <p>Digital Download: .MP3, .AAC (1) more suitable for digital downloading as files are compressed.</p> <p><b>Sample Rate:</b></p> <p>CD: 44.1kHz (1) CD standard requirement (1)</p> <p>Digital Download: 44.1kHz (or 48kHz) (1) to enable all audible frequencies to be heard</p> <p><b>Bit Depth:</b></p> <p>CD: 16-bit (1) CD standard requirement (1)</p> <p>Digital Download: 16-bit (or 24-bit) (1) to keep files free from quantisation noise (1) (or to prevent noise/distortion).</p>	4
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**Section 3**

**Total for this section: 10 marks**

<p><b>12</b></p>	<p>Figure 1 <b>shows a top-down floor plan of a recording studio control room. The room features parallel facing surfaces.</b></p> <p><b>Identify one acoustical problem associated with parallel facing surfaces.</b></p> <p>Answer. Standing waves (1).</p>	<p><b>1</b></p>
<p><b>13</b></p>	<p>Figure 2 <b>shows a DAW set-up.</b></p> <p><b>Identify two possible health and safety hazards you can see in this picture.</b></p> <p>Award correct responses up to a maximum of 2 marks.</p> <p>Trailing cables Liquids Noise exposure Display screen</p>	<p><b>2</b></p>
<p><b>14</b></p>	<p>Figure 3 <b>shows some of the components of a dynamic microphone.</b></p> <p><b>Explain the function of the coil in relation to how a dynamic microphone works.</b></p> <p>Award 1 mark for correct description of component and 1 mark for explanation (1).</p> <p>When the diaphragm moves in response to sound waves, the coil moves backwards and forwards over a magnet (1) creating an electrical signal (1).</p> <p>An electrical signal which is analogous to diaphragm movement is created (1) by the process of electromagnetic induction as the coil moves over a permanent magnet (1).</p>	<p><b>2</b></p>

<p><b>15</b></p>	<p><b>The acoustic guitar heard in Audio File Section 3 has been recorded with a microphone which was placed at a distant position (approximately 12 feet away).</b></p> <p><b>Describe two advantages of recording the acoustic guitar with a closely positioned microphone.</b></p> <p>Award 1 mark for each correct advantage up to a maximum of 2 marks.</p> <p><b>Advantages:</b>  Greater instrument detail to be captured.  Less background noise.  More high frequencies captured.  Less relative microphone / pre-amp noise (self-noise/noise floor).  Increased low frequency response (proximity effect).</p> <p>Accept any other reasonable responses.</p>	<p><b>2</b></p>
<p><b>16</b></p>	<p><b>The electric guitar part at 00:13s in Audio File Section 3 has a chorus effect applied to it.</b></p> <p><b>Figure 4 shows a chorus plugin which has only three controls. Identify the most likely function of the dial indicated by the arrow.</b></p> <p>Answer: D (Rate)</p>	<p><b>1</b></p>
<p><b>17</b></p>	<p><b>Audio File Section 3 has had a limiter applied to the stereo output.</b></p> <p><b>Explain one way in which the limiter's settings have negatively affected the audio.</b></p> <p>Award one mark for problematic setting and one mark for audible impact.</p> <p>The threshold has been set too low (1) which has led to reduced dynamic range (accept distortion) (1).</p>	<p><b>2</b></p>

**Section 4**

**Total for this section: 10 marks**

<p><b>18</b></p>	<p><b>Figure 5 shows 4 sound waves over the same period of time.</b></p> <p><b>Identify the wave with the highest frequency.</b></p> <p>Answer: D</p>	<p><b>1</b></p>
<p><b>19</b></p>	<p><b>Sampled drums can be heard entering the mix at 00:18 of Audio File Section 4. The sampled drums use velocity switching.</b></p> <p><b>Explain one way in which using velocity switching is musically useful when creating a sampled instrument.</b></p> <p>Award one mark for correct function of velocity switching and one mark for valid advantage.</p> <p>Allows the playback of different audio files at different velocities (1) this makes the instrument more realistic (1).</p> <p>Allows the playback of different audio files at different velocities (1) giving capacity to trigger accented sounds / more HF content at higher velocities (1).</p>	<p><b>2</b></p>
<p><b>20</b></p>	<p><b>At 00:18s of Audio File Section 4, two synthesisers enter the mix playing rising melodies.</b></p> <p><b>One synthesiser uses a sawtooth wave oscillator as its source, the other synthesiser uses a triangle wave oscillator.</b></p> <p><b>Explain how the harmonic content of a triangle wave differs from that of a sawtooth wave.</b></p> <p>Award 1 mark for correct identification of numbered harmonics up to a maximum of 2 marks. (Triangle = odd; Sawtooth = odd and even)</p> <p>Accept description of low pass filter impact on harmonic content for 1 mark only.</p> <p>A triangle wave features only odd harmonics (1) whilst a sawtooth features both odd and even harmonics (1).</p>	<p><b>2</b></p>



<p><b>21</b></p>	<p><b>Modulation has been applied to the ascending melody synthesiser part heard between 00:02s and 00:18s of Audio File Section 4.</b></p> <p><b>Identify two synthesiser parameters which are being modulated.</b></p> <p>Award 1 mark for Tremolo.</p> <p>Award 1 mark for filter cut-off.</p>	<p><b>2</b></p>
<p><b>22</b></p>	<p><b>Figure 6 shows a recording of a snare drum. The unedited audio file has been imported into a sampler and used in Audio File Section 4.</b></p> <p><b>You can hear the resulting snare drum sound between 00:18s and 00:35s of Audio File Section 4.</b></p> <p><b>Identify one musical problem which is a result of the audio file being used in its unedited state.</b></p> <p>Award 1 mark for correct statement.</p> <p>Second snare hit in audio file is slightly rhythmically intrusive.</p>	<p><b>1</b></p>
<p><b>23</b></p>	<p><b>Figure 7 shows controls on a subtractive synthesiser.</b></p> <p><b>Explain how you could use the LFO controls to create a ‘helicopter’ style sound like the one you can hear at 00:00s of Audio File Section 4.</b></p> <p>Award one mark for correct setting and one mark for expansion.</p> <p>LFO should be set to filter cut-off (1) to replicate the ‘swooshing’ sound of rotors (1).</p> <p>LFO should be set to output (1) to replicate a fast tremolo sound (1).</p>	<p><b>2</b></p>

Section 5

Total for this section: 10 marks

<p>24</p>	<p><b>The Flaming Fretboards' saxophonist likes to control her own effects when she is performing.</b></p> <p><b>Explain one disadvantage of a musician controlling their own effects compared to a Front of House engineer controlling the effects for them.</b></p> <p>Award one mark for correct disadvantage, award one mark for expansion:</p> <p>The saxophonist can't hear the sound out of the PA system (1) therefore she might apply too much, or too little of the effect (1).</p> <p>Credit reversals:</p> <p>The engineer is positioned in front of the main PA system (1) and is therefore best placed to make adjustments to the sound of effects as required (1).</p> <p>Accept any other valid response.</p>	<p>2</p>
<p>25</p>	<p><b>The Front of House engineer wants to use a laptop DAW for live sound mixing.</b></p> <p><b>Explain one advantage of using a laptop DAW for live sound reinforcement compared to an analogue mixing desk and outboard equipment.</b></p> <p>Award one mark for correct advantage and one mark for expansion.</p> <p>Less equipment to carry (1) therefore easier to transport to venues (1).</p> <p>Settings can be retained (1) minimising set up time (1).</p> <p>Setting for individual songs can be instantly recalled (1) allowing for better workflow / more creative mixing (1).</p> <p>Can be moved around the venue (1) to allow the engineer to mix in different positions, achieving a more balanced sound (1).</p> <p>Accept any other valid responses.</p>	<p>2</p>

<p><b>26</b></p>	<p>Figure 8 shows a <b>BS1363 socket</b>.</p> <p><b>Identify the voltage rating for this type of socket.</b></p> <p>Answer: C (230V)</p>	<p><b>1</b></p>
<p><b>27</b></p>	<p>The singer of the <b>Flaming Fretboards</b> is not always able to hear himself well on certain parts of the stage during live performances.</p> <p><b>Explain one way of improving clarity of monitoring on all parts of the stage.</b></p> <p>Award one mark for improvement, award one mark for expansion.</p> <p>IEM systems could be used (1) to minimise stage noise (1).  Monitor speaker placement considered (1) to avoid spill / give focus (1).</p> <p>Accept any other valid response.</p>	<p><b>2</b></p>
<p><b>28</b></p>	<p>Venues usually ask artists to produce <b>PAT (Portable Appliance Testing) certificates</b> for all electrical equipment that they use onstage. <b>PAT reduces electrical hazards by checking that equipment is safe to use.</b></p> <p><b>Describe one other way that onstage electrical hazards can be reduced.</b></p> <p>Award one mark for correct response.</p> <p>Ensure sockets are not overloaded (1).</p> <p>Instruct artists to keep liquids away from power sockets (1).</p> <p>Use of RCD circuit breakers (1).</p> <p>Visual check of connectors and cables before plugging in (1).</p>	<p><b>1</b></p>
<p><b>29</b></p>	<p>Figure 9 shows a section of the mixing desk channel list for the <b>Flaming Fretboards</b>.</p> <p><b>The mixing desk has capacity to bus channels to groups. Explain why it would be useful for the Sound Engineer to send Channels 1-7 to a group.</b></p> <p>Routing the drum channels to one group would provide overall level control of the drums via one fader (1) making changes faster (1).</p>	<p><b>2</b></p>



**Section 6**

**Total for this section: 10 marks**

<p><b>30</b></p>	<p><b>The Flaming Fretboards have decided to release their album through a record label instead of using an artist-direct (DIY) model.</b></p> <p><b>Explain one advantage of using a record label to release material.</b></p> <p>Award one mark for identification of an advantage, award one mark for valid expansion.</p> <p>Record labels will handle distribution (1) and are likely to have preferential deals with distributors in place (1).</p> <p>Record labels offer marketing and merchandise (accept 360-deal) (1) which may lead to further exposure of the band (1).</p> <p>Record labels will advance funds to cover the cost of producing the album (1) so the band don't have to fund the recording of the album out of their own pockets (1).</p> <p>Accept any other valid response.</p>	<p><b>2</b></p>
<p><b>31</b></p>	<p><b>Which of the following is an artist-direct online retail outlet.</b></p> <p><b>A Apple Music</b>  <b>B Bandcamp</b>  <b>C Spotify</b>  <b>D Tidal</b></p> <p>Answer: B (Bandcamp)</p>	<p><b>1</b></p>
<p><b>32</b></p>	<p><b>The Flaming Fretboards are posting video clips on social media of themselves working in the studio.</b></p> <p><b>Describe how using video material in this way might help the band in promoting their forthcoming release.</b></p> <p>Award one mark for valid reason and one mark for expansion.</p> <p>Allows band members to discuss their experiences of recording (1) helping fans feel closer to the artist (1).</p> <p>Snippets of songs being recorded can act as a preview (1) which will engage fans prior to the official release of material (1).</p>	<p><b>2</b></p>

<p><b>33</b></p>	<p><b>The Flaming Fretboards have been looking at the income and expenditure records for sales of their merchandise. The band want to find the break-even point for each type of merchandise. The break-even point is the point at which income is the same as the cost of production.</b></p> <p>Figure 10 shows sales of each type of merchandise over a 6-month period.</p> <p><b>Use Figure 10 above to complete the table below. Write in the month when each piece of merchandise reaches its break-even point.</b></p> <p>1 Mark for each correct month:</p> <p>Posters: March (1)  T-shirts: April (1)  Wristbands: May (1)</p>	<p><b>3</b></p>
<p><b>34</b></p>	<p><b>The Flaming Fretboards are collecting data about their fan-base, including the audience demographic.</b></p> <p><b>Explain one way in which the band could use the audience demographic data to inform their planning.</b></p> <p>Award 1 mark for description of demographic data and one mark for how it could be used.</p> <p>Demographic data depicts the type of people who like the music (by age, gender etc.) (1). This data can help inform the band as to which venues to play at (1) <b>or</b> what style of merchandise to produce (1) <b>or</b> which forms of media/journalism/broadcasting to utilise/approach (1).</p>	<p><b>2</b></p>