Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel Level 3 GCE

Centre Number | | | | | |

Candidate Number | | | | |

Wednesday 3 June 2020

Morning (Time: 2 hours 15 minutes) (plus 10 minutes setting up time)

Paper Reference **9MT0/04**

Music Technology
Advanced
Component 4: Producing and Analysing

You must have: Figure 1 for Question 6 (enclosed), CD ROM containing component audio/MIDI files, blank CD for burning finished tasks, headphones or monitor speakers, digital audio workstation (DAW) and MIDI keyboard.

Total Marks

Setting up time

- Open a new project in your DAW using 16 bit/44.1kHz sample rate.
- Save the project as **'comp4_your candidate number' (e.g. comp4_1234)** in the folder designated by your centre.
- Set the metronome to **120 bpm**.
- Import 'drums.wav' to a new track in your DAW, aligned with the beginning of bar 1.
- Ensure that the drums are audible and play in time with the metronome. The drums begin at the start of bar 4.
- You must not open the paper until instructed to do so by the invigilator.

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Save your audio files for Questions 1, 2, 3 and 5 within the 2 hour 15 minute examination time.
- You must ensure that the left and right earpieces of your headphones are worn correctly.
- Access to a calculator or calculator software is not permitted.
- Access to the internet or local network is not permitted.

Information

- The total mark for this paper is 105.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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SECTION A

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Question 1 is about the drum part.

1 Listen to the drums that you have imported.

(a) Identify the process that has been applied to the cymbal in bar 13.

(1)

- ☒ **A** Distortion
- ☒ **B** Flange
- ☒ **C** Normalise
- ☒ **D** Reverse

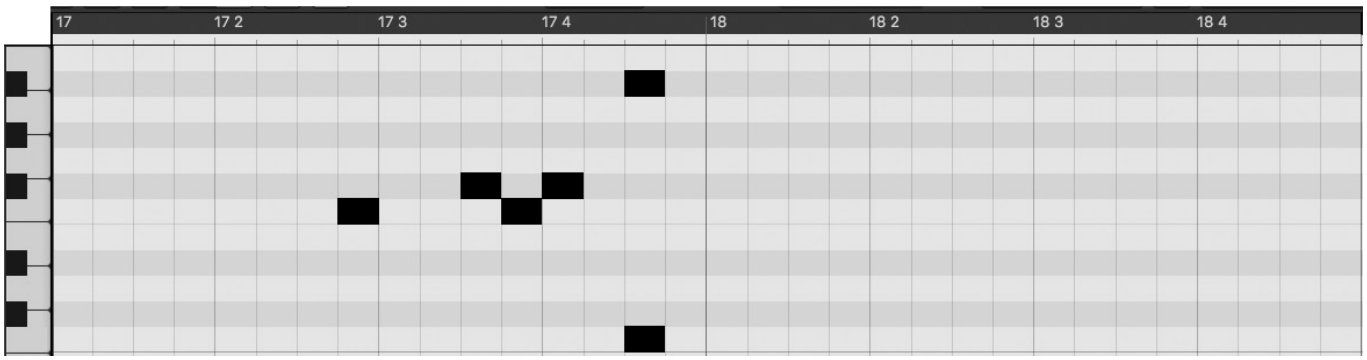
(b) Listen to bars 14–22. Most of the drums have been quantised to 1/16 note. Identify a bar where quantising to 1/16 would incorrectly change the rhythm.

(1)

Bar.....

(c) Draw the drum part for bar 18 on the piano roll editor below. Bar 17 has been completed for you.

(4)



(d) The drums are out of time in bars 23–29. Edit the audio so that the drums are in time. Repair the partially cut kick drum on bar 30 beat 1.

(5)

Bounce/export the completed drum part as a single 16 bit/44.1kHz stereo .wav file to the designated folder on your computer.

Name it 'q1_ your candidate number' (e.g. q1_1234).

(Total for Question 1 = 11 marks)

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Question 2 is about the synth fills part.

2 Import the MIDI file 'synth fills.mid' to a new track in your DAW. Align the part so that the synth fills begin playing at the start of bar 22.

(a) Complete the table below to give the highest modulation value in bar 25. You must give your answer in decimal and binary as shown in the example.

Bar	Highest modulation value in decimal	Highest modulation value in binary
24	110	01101110
25	**(1)**	**(1)**

(b) Import 'synth fills example.wav' to a new track in your DAW. The file illustrates how bars 27–28 of the synth fills part should sound. You should not use this audio in your final mix.

Create a synth sound that matches the timbre 'synth fills example.wav'.

(i) Ensure that the octave matches the example.

(1)

(ii) Use a square wave with no effects.

(1)

(iii) Ensure the pitch bend range is set to 7 semitones.

(1)

(iv) Copy the amplitude envelope.

(1)

(v) Copy the velocity sensitive filtering.

(2)

(c) There are timing errors in the synth fills part in bars 22 and 24. Correct the timing errors so that the rhythm in bars 22 and 24 is the same as bar 26.

(2)

Bounce/export the completed synth fills part as a single 16 bit/44.1kHz stereo .wav file to the designated folder on your computer.

Name it 'q2_ your candidate number' (e.g. q2_1234).

(Total for Question 2 = 10 marks)

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Question 3 is about the synth riff and piano part, and creating a bass part.

3 Import 'synth riff and piano.wav' to a new track in your DAW. The beginning of this audio track should be aligned with the start of bar 1. The riff begins at the start of bar 2.

(a) The synth riff in bar 30 has an LFO modulating the sound.

(i) Identify the wave shape of the LFO.

(1)

- ☒ **A** Saw
- ☒ **B** Sine
- ☒ **C** Square
- ☒ **D** White noise

(ii) Identify what the LFO is routed to.

(1)

- ☒ **A** Cutoff frequency
- ☒ **B** Pitch
- ☒ **C** Pulse width
- ☒ **D** Volume

(iii) Identify what effect this LFO routing creates.

(1)

- ☒ **A** Chorus
- ☒ **B** Tremolo
- ☒ **C** Vibrato
- ☒ **D** Wah wah

(iv) The tempo is 120 bpm so the duration of a crotchet is 0.5 seconds. The LFO is timed in quavers. Calculate the frequency in Hz of the LFO. Show your working.

(4)

Frequency ..... Hz

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(v) On the graph below:

- Draw the waveform identified in part (i).

(1)

- Label the axes.

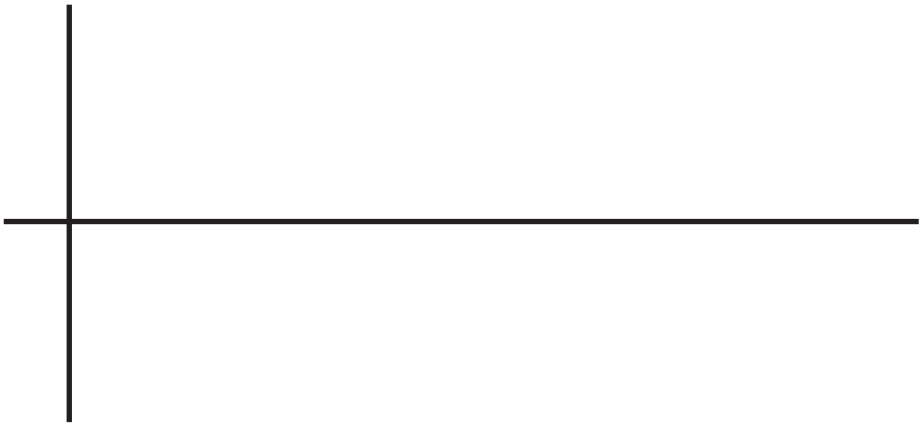
(2)

- Label the amplitude of the LFO.

(1)

- Label the period.

(1)



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(b) Identify the bar when the piano enters.

(1)

Bar.....

(c) The synth riff is a two bar loop with occasional variations.

(i) Excluding the LFO effect and filtering, identify **two** bars where there is a variation.

(2)

Bar.....

Bar.....

(ii) Import 'bass.wav' into your DAW.

Create a bass part:

- Use audio from 'bass.wav'.
- The bass must begin at the start of bar 6.
- The bass must finish at the end of bar 29.
- The bass must play in unison with the synth riff throughout.
- The bass must not have any clicks or glitches.

(8)

Bounce/export the completed bass part as a single 16 bit/44.1kHz stereo .wav file to the designated folder on your computer.

Name it 'q3_ your candidate number' (e.g. q3_1234).

(Total for Question 3 = 23 marks)

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Question 4 is about the vocal part.

4 Import 'vocal.wav' to a new track in your DAW. The beginning of this audio track should be aligned with the start of bar 1. The singing begins in bar 6.

(a) Listen to bars 12–21. A gate was used to remove ambient noise on the vocal recording. Identify the problem that the gate has introduced.

(1)

.....

(b) Complete the following sentence about audio formats such as mp3 and AAC.

(3)

Lossy compression ..... some

of the data, so there is a ..... in

sound quality. A benefit of lossy compression is that the file size would

be ..... than an uncompressed file.

(c) Below are listed four audio formats in alphabetical order.

1. AAC at 320kbps

2. AIFF with a sample rate of 44.1kHz, bit depth of 4 bits

3. CD

4. mp3 at 160kbps

Complete the table below to rank the audio formats in order of sound quality.

(3)

Quality	Audio format
Best	
Second best	
Third best	
Worst	

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(d) The phrase 'to piece back all the parts' in bars 24–25 of the vocal has been compressed using mp3.

(i) Name the unwanted sounds that have been introduced by the data compression.

(1)

.....

(ii) Identify the bit rate that has been used.

(1)

☒ **A** 1 kbps

☒ **B** 40 kbps

☒ **C** 128 kbps

☒ **D** 320 kbps

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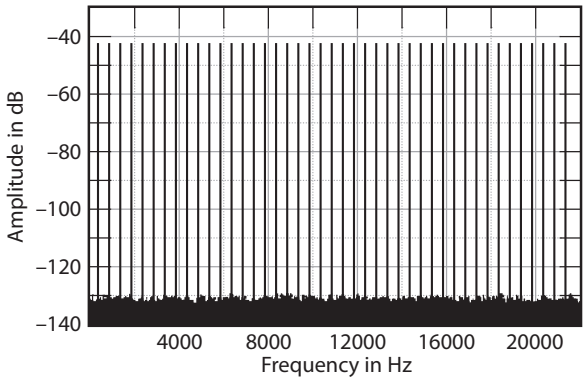
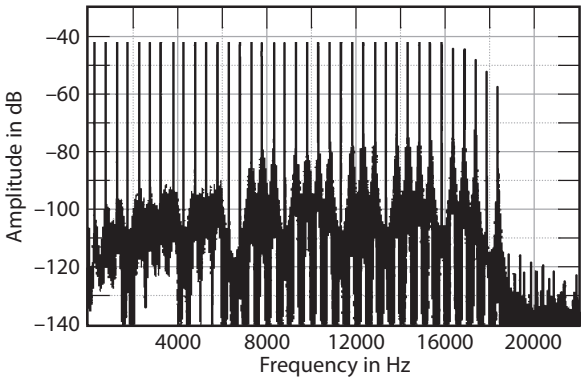
(e) In an experiment, an engineer recorded 500Hz-spaced sine waves to CD (compact disc) and AAC (advanced audio coding used in iTunes). The graphs below show the results. With reference to the graphs, evaluate the difference in sound quality between CD and AAC.

(8)

CD



AAC



(Total for Question 4 = 17 marks)

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5 You should now have the following tracks in your DAW: drums, synth fills, synth riff and piano, bass and vocal.

(a) Apply automated panning to the synth riff.

- Only bars 4–5 should be affected; all other bars should be panned to the centre.
- Bar 4 should be panned hard left.
- Bar 5 should be panned hard right.

(3)

(b) Apply an automated filter to the synth riff.

- Only bars 10–13 should be affected.
- Use the filter type as heard in bars 6–9.
- At the beginning of bar 10, the cut-off frequency should be set the same as heard in bar 9.
- Gradually increase the cut-off frequency so that the effect continues to build until the end of bar 13.

(3)

(c) Listen to the modulation effect on the synth riff in bar 30. Recreate the same effect in bars 31–33.

(3)

(d) Retune the vocal in bar 25.

- Retune 'parts' so that it is the same pitch as 'piece back'.

(3)

(e) Listen to the rhythmic reverb effect in bars 6–7 on the vocal. Recreate the same effect in bars 8–33.

- The dry signal should remain unaffected.
- The gate on the reverb is side-chained to the drums.

(6)

(f) Balance the levels of the mix.

(3)

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(g) 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 at the end do not exceed one second.

(3)

Bounce/export the completed mix as a single 16 bit/44.1kHz stereo .wav file to the designated folder on your computer.

Name it 'q5_ your candidate number' (e.g. q5_1234).

(Total for Question 5 = 24 marks)

TOTAL FOR SECTION A = 85 MARKS

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SECTION B

Answer Question 6. Write your answer in the space provided.

6 Figure 1 shows a mix of three electric guitar parts in a rock recording. EQ, gate and reverb are inserted into the channels. The rhythm guitar is double tracked. The final mix will also include bass guitar, drums and vocals.

Evaluate the suitability of the routing and plug-in settings for a rock recording.

(20)

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(Total for Question 6 = 20 marks)

TOTAL FOR SECTION B = 20 MARKS
TOTAL FOR PAPER = 105 MARKS

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Music Technology

Advanced

Component 4: Producing and Analysing

Figure 1 for Question 6

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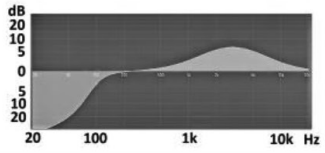
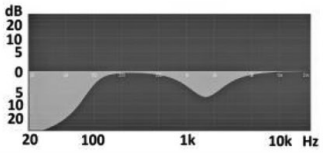
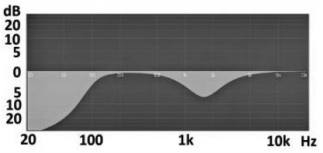
Figure 1

EQ			
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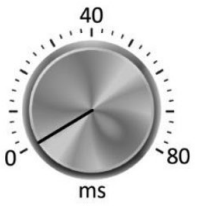
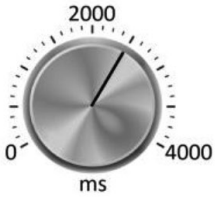
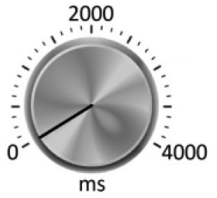
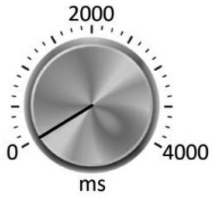
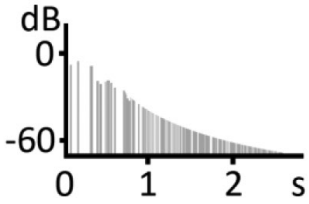
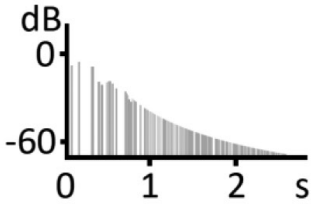
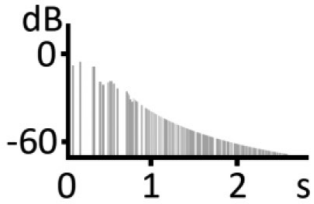
	Attack	Attack	Attack 
	Release 	Release 	Release 
Reverb	Plate 	Plate 	Plate 
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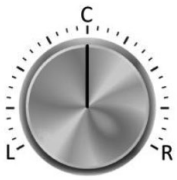
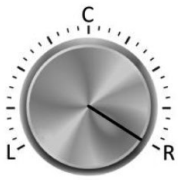
Pan			
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