

Paper Reference(s) 9MT0/04

Pearson Edexcel Level 3 GCE

Music Technology

Advanced

Component 4: Producing and analysing

Wednesday 5 June 2019 – Afternoon

**Time: 2 hours 15 minutes (plus 10 minutes
setting up time) plus your additional
time allowance**

INSTRUCTIONS TO CANDIDATES

**Write your centre number, candidate number,
surname, other names and your signature in
the boxes below, or write these at the top of
your first page of word processed answers.
Check that you have the correct question
paper.**

Centre No.					
Candidate No.					
Surname					
Other names					
Signature					
Paper Reference	9	M	T	0	/ 0 4



- **Use BLACK ink or ball-point pen, or your approved technology.**
- **Answer ALL questions.**
- **Save your audio files for Questions 1, 2, 4 and 5 within the 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.**

SETTING UP TIME

- **Open a new project in your DAW using 16 bit/44.1 kHz 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 124 bpm.**
- **Import 'bass.wav' to a new track in your DAW, aligned with the beginning of bar 1.**
- **Ensure that the bass is audible and plays in time with the metronome. The bass begins in bar 4.**

(Instructions continue on next page)

(Turn over)

- You must not open the paper until instructed to do so by the invigilator.

MATERIALS REQUIRED FOR EXAMINATION
CD ROM containing component audio/MIDI files, blank CD for burning finished tasks, headphones or monitor speakers, digital audio workstation (DAW) and MIDI keyboard

ITEMS INCLUDED WITH QUESTION PAPERS
Diagram for use with Question 4(e)
Figure 1 (colour and black and white version) for use with Question 6

INFORMATION FOR CANDIDATES

- 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 TO CANDIDATES

- 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)

SECTION A

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

Question 1 is about the bass guitar part.

- 1 (a) (i) Identify the unwanted noise on the bass guitar. (1 mark)**

- 1 (a) (ii) List TWO ways this noise could have been avoided whilst recording. (2 marks)**

1

2

(Question continues on next page)

(Turn over)

- 1 (b) (i) On a noise gate, describe how the threshold control affects the signal. (2 marks)

- 1 (b) (ii) Explain the challenges of using a gate to remove the noise heard on the bass track. (2 marks)

(Question continues on next page)

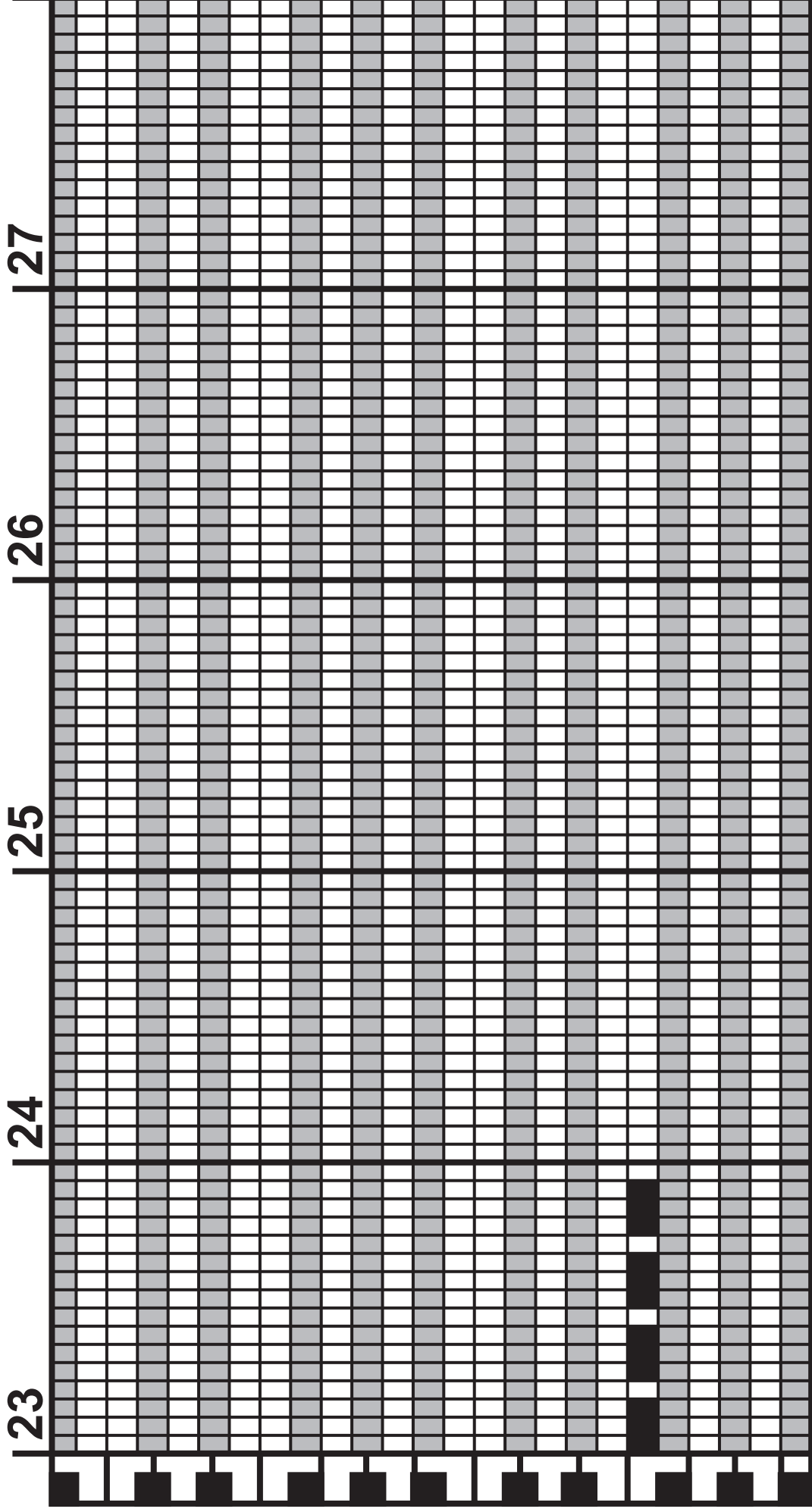
(Turn over)

- 1 (c) Apply a gate to the bass guitar to remove the noise without unwanted side-effects. (3 marks)

- 1 (d) Draw or describe precisely where blocks go on the piano roll editor diagram on page 7 for the bass part for bars 24 to 27. Bar 23 has been shown, with four strips drawn on the horizontal for the white keyboard note above three black notes. The four blocks are all three spaces long separated by a blank block. The roll has on the left a vertical keyboard layout from the bottom black note of three going up to that note again two full patterns up. The horizontal axis is divided into bars 23 to 27 which each bar divided into 16 blocks.
(5 marks)

(Question continues on next page)

(Turn over)



(Question continues on next page)

(Turn over)

1 (e) Complete the bass part for bars 44–45 in your DAW.

- **Use audio from bar 41.**
- **The pitch and rhythm are shown in the piano roll editor below.**

(5 marks)

(Question continues on next page)

(Turn over)

The diagram on page 10 shows a piano roll extract with a keyboard layout draw in the vertical axis from the white note in the middle of two black notes to the note to the right black note of two an octave higher. The horizontal axis is labelled 44, 44.2, 44.3, 44.4, 45, 45.2, 45.3, 45.4, 46 with each label being divided into four blocks.

The shaded blocks all appear in the line five down from the top of the diagram. They are arranged as follows:

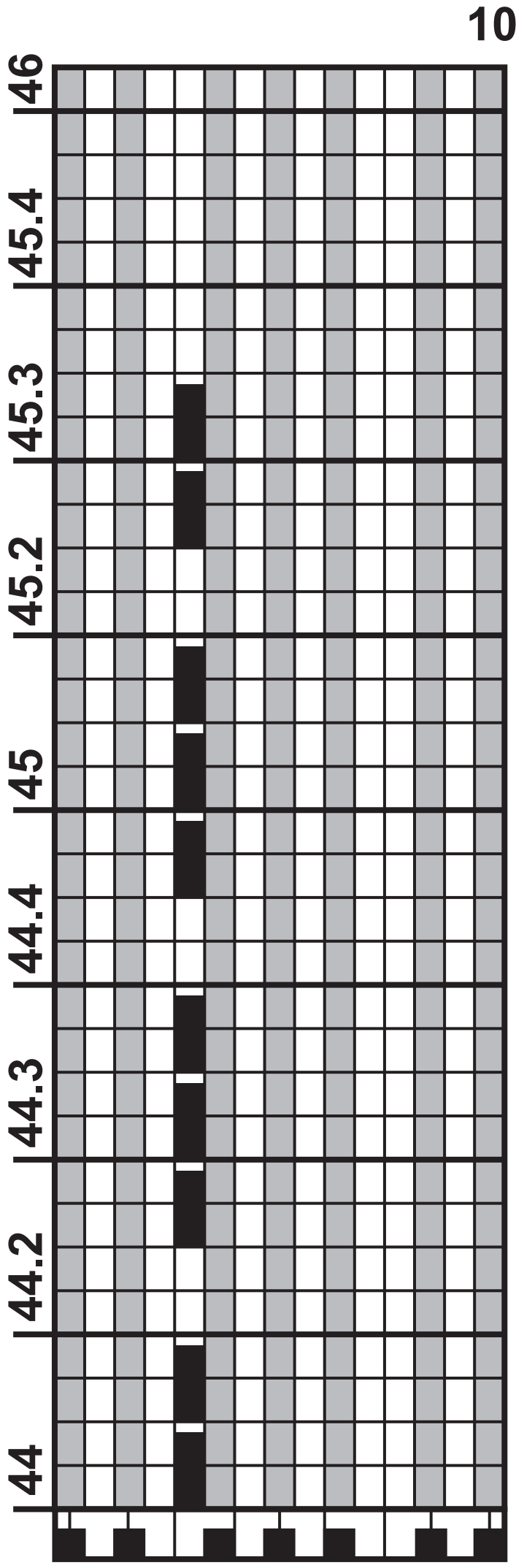
44: two blocks almost completely filling the area, with just a small gap half way through and at the end. 44:2 second half filled in.

These two are repeated in 44.3/44.4 and 45/45.2.

The extract ends with one block starting at the beginning of 45.3 and ending just before half way through this division.

(Question continues on next page)

(Turn over)



(Question continues on next page)

(Turn over)

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

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

(TOTAL FOR QUESTION 1 = 20 MARKS)

(Questions continue on next page)

(Turn over)

Question 2 is about the drum part.

2 Import the MIDI file ‘drums.mid’ to a new track in your DAW. Align the part so that the drums begin playing at the start of bar 4.

2 (a) The velocity in decimal 113 equals the velocity in binary of 01110001. Taking this example of the first event

2 (a) (i) Give the velocity in decimal and in binary of the second event in the MIDI file. (2 marks)

2 (a) (ii) Give the velocity in decimal and in binary of the third event in the MIDI file. (2 marks)

(Question continues on next page)

(Turn over)

- 2 (b) Other than Note On and Note Off, identify THREE other MIDI messages present in the MIDI file. (3 marks)**

1 _____

2 _____

3 _____

(Question continues on next page)

(Turn over)

- 2 (c) 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 rock style drum part. You should not change the rhythm.**
- **Kick drum**
 - **Snare**
 - **Crash**
 - **Closed hi-hat starting at bar 11, beat 4**
 - **Ride cymbal starting at bar 12, beat 1 (5 marks)**

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

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

(TOTAL FOR QUESTION 2 = 12 MARKS)

(Questions continue on next page)

(Turn over)

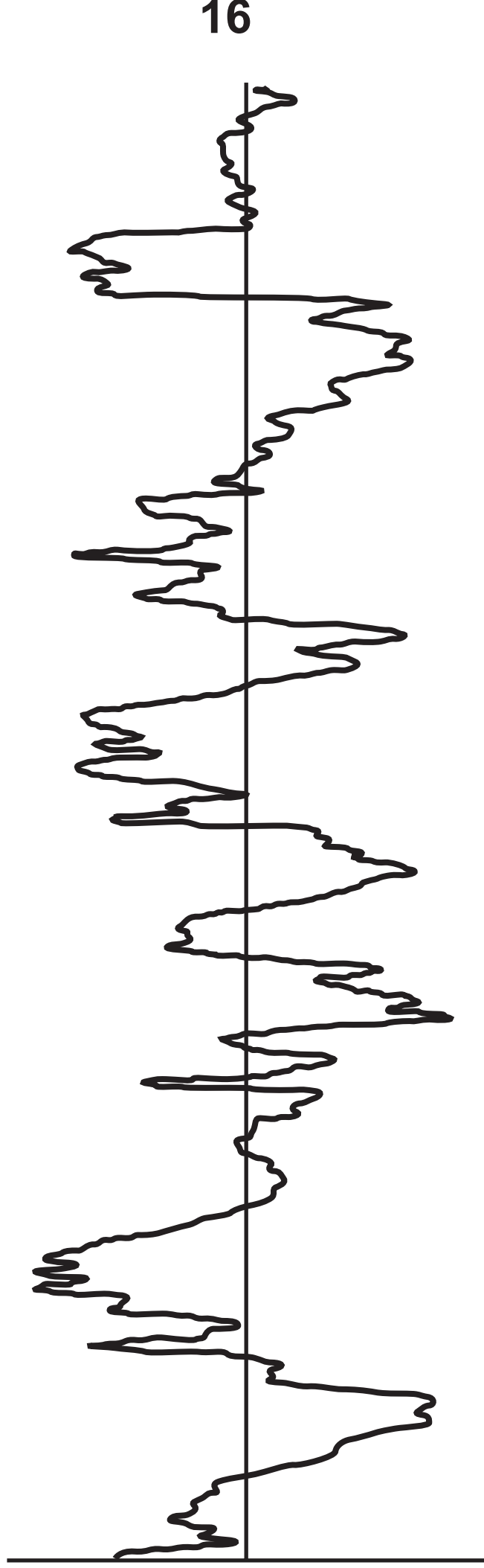
Question 3 is about the guitar part.

- 3 Import 'guitar.wav' to a new track in your DAW. This track is the electric guitar part. Ensure that the beginning of this audio track is aligned with the start of bar 1. The electric guitar begins at the start of bar 2.**

(Question continues on next page)

(Turn over)

The graph below shows the waveform of the clean DI guitar signal in bar 4.



(Question continues on next page)

(Turn over)

- 3 (a) Label the axes. (2 marks)
- 3 (b) On top of the original waveform, draw, or describe precisely, the change in the waveform shape once distortion has been added. (2 marks)
- 3 (c) State how adding distortion changes the dynamic range. (1 mark)

(TOTAL FOR QUESTION 3 = 5 MARKS)

(Questions continue on next page)

(Turn over)

Question 4 is about the vocals.

- 4 Import ‘vocal main.wav’ to a new track in your DAW. This track is the lead vocal part. Ensure that the beginning of this audio track is aligned with the start of bar 1. The vocal begins during the second beat of bar 3.**
 - 4 (a) There are some artefacts in the vocal part which are clearly audible in bars 43–44.**
 - 4 (a) (i) Identify the processor that caused the artefacts. (1 mark)**
-

(Question continues on next page)

(Turn over)

- 4 (a) (ii) State what an audio artefact is.
(1 mark)**

- 4 (b) There is some headphone spill on the vocal recording. State TWO ways you would have reduced headphone spill whilst recording. (2 marks)**

1

2

(Question continues on next page)

(Turn over)

- 4 (c) Import 'vocal sample.wav' into your DAW.
- 4 (c) (i) Which wave shape is most similar to the vocal sample? Choose from pulse, saw, sine, white noise. (1 mark)

- 4 (c) (ii) The frequency of the sample is 294 Hz. Calculate the frequency of a note an octave higher. Show your working. (2 marks)

_____ Hz

(Question continues on next page)

(Turn over)

- 4 (d) Create a backing vocal part for bars 36–43 in your DAW.**
- **Use the audio from ‘vocal sample.wav’.**
 - **The pitch of ‘vocal sample.wav’ is D as indicated by a dot on the piano roll.**
 - **The completed backing vocal should have pitch and rhythm as shown on the piano roll.**
 - **Repeat this part in bars 40–43.**
 - **The lower vocal part must be panned left; the upper part must be panned right.**

(9 marks)

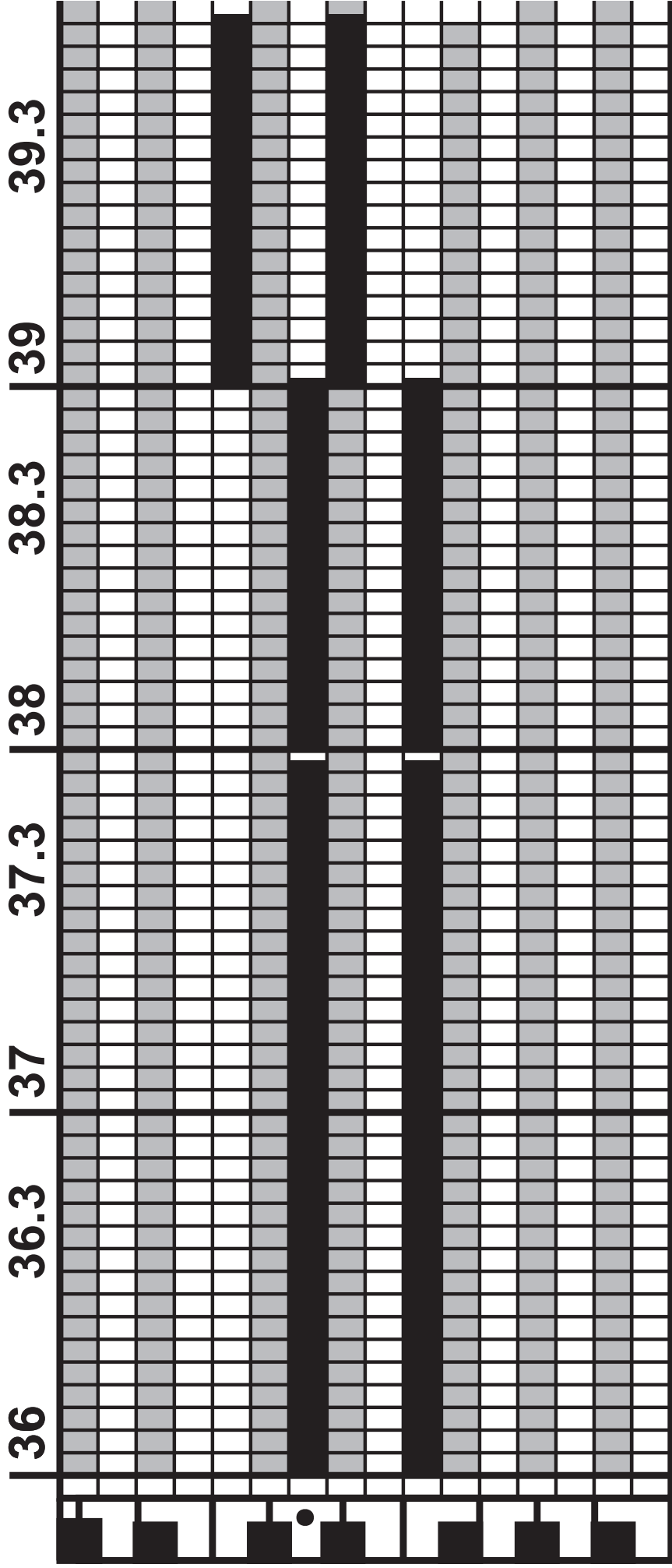
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(Turn over)

The piano roll on page 23 shows a vertical keyboard going up from F to the G an octave a note higher. The horizontal axis is divided into main markers of 36, 37, 38, 39 (the thicker lines in the tactile diagram) with additional labels half way between each of those of 36.3, 37.3, 38.3, 39.3. There are two parts shown in the piano roll that move in parallel. The top part shows a continuous bar through 36 and 37, ending just before 38, and then throughout 38 on D as described in the question. In bar 39, the top part moves up two rows and has a block starting at the beginning of the bar and ending just before the end of the bar. The lower part has the same length bars all three rows lower.

(Question continues on next page)

(Turn over)



(Question continues on next page)

(Turn over)

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

Name it 'q4_ your candidate number' (e.g. q4_1234).

(Question continues on next page)

(Turn over)

- 4 (e) The diagram on the separate sheet provided shows technical specifications for a microphone. Evaluate the suitability of the microphone for recording vocals. (8 marks)**

(Question continues on next page)

Measure in free-field conditions (IEC 60268-4), tolerance plus/minus 2 dB. The graph shows two fields. The thicker line shows the Freifeld/Free field. The dotted line shows the Nahfeld/Near field 5 cm. The vertical axis is labelled in dB from the bottom upwards as –20, –10, 0, +10. The horizontal axis, in kHz, reads 20, 50, 100, 200, 500, 1 k (in the middle) 2k, 5k, 10 k 20 kHz. The labels in the horizontal axis are evenly spaced.

The concentric circle diagram is labelled clockwise in degrees, with 0 at 12 o'clock, 45 degrees half way to 3 o'clock, 90 degrees at 3 o'clock, 135 degrees half way to 6 o'clock, 180 degrees at 6 o'clock, 225 degrees half way to 9 o'clock, 270 degrees at 9 o'clock, 315 degrees half way to 12 o'clock. The circles are labelled in dB from the centre outwards as 20 15, 10, 5, 0. The plotting is shown in the thicker line.

(Begin your answer on next page)

(Turn over)

(Turn over)

- 5 You should now have the following tracks in your DAW: bass guitar, drums, electric guitar, lead vocal and backing vocals.**
- 5 (a) Apply reverb to the vocal and backing vocals.**
- **Use a 3 second reverb**
 - **The reverb should blend the vocal with the electric guitar.**
- (3 marks)**
- 5 (b) Import 'drum example.wav' to a new track in your DAW. This file illustrates an effect on a snare drum. You should not use this audio in your final mix.**
- Apply the effect heard in 'drum example.wav' to the drum track.**
- (3 marks)**
- 5 (c) Listen to the modulation effect on the guitar in bars 4–5. Recreate that effect in all other bars. (3 marks)**

(Question continues on next page)

(Turn over)

5 (d) Gate the vocals.

- **Only bars 34–35 should be affected.**
- **The bass track should trigger the side chain of the gate so that the vocal plays in time with the bass.**
- **The vocal reverb should not be gated.**

(3 marks)

(Question continues on next page)

(Turn over)

5 (e) Listen to the effect in bar 43 on the bass. Recreate the same effect in bars 20–42.

- **The dry signal should remain unaffected.**
- **An additional signal should be pitch shifted up an octave and heavily distorted.**
- **Balance the dry and effected signal so they sound equal in volume.**
- **Pan the distorted signal to match bar 43.**

(6 marks)

**5 (f) Balance the levels of the mix.
(3 marks)**

(Question continues on next page)

(Turn over)

5 (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 marks)

Bounce/export the completed mix as a single 16 bit/44.1 kHz 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
(Section B begins on next page)

(Turn over)

SECTION B

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

- 6 Figure 1 shows a synthesiser from 1982. Evaluate the suitability of the settings shown to produce a synth pad. (20 marks)**

Figure 1 shown on separate sheets provided shows part of a keyboard, with “Jun” as part of the brand, a row of functions headed: LFO, DCO, HPF, VCF, VCA, ENV all with red background and Chorus with blue background. In the lower half of the picture left to right is a keyboard of four octaves from G to G. There are two pushers and one button in LFO. The pushers cover three graduated scales from 0 to 10. The label over the left and part of the middle scale is “Rate” and on the right part of the middle and the right “Delay time”. The left pusher is set half way up and the

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(Turn over)

right pusher is set at the bottom. The button is labelled Trig Mode with a choice of settings of Auto (top) or Main (bottom). It is set on Auto.

DCO has from left to right two pushers, a three way button, three coloured square pads (pale yellow, yellow, orange) and a further two pushers.

Again the pushers have three scales each. The left column is labelled VIB and has number 5 at half way up and 10 at the top. The pusher is at the bottom of the column. The second label to the right is PWM and bracketed with the button and also the first light and square pale yellow button. The scale on the PWM pusher has 0 at the bottom, 5 half way up and 10 at the top. The pusher is at 10. Then follows a button which has three positions. The bottom position is labelled ENV and has a little mountain shaped graph line, the middle is labelled Manual and the top, where the button is, is labelled LFO.

(Continues on next page)

(Turn over)

Then come the three large square buttons each of which has a light and a graphic. The first button, pale yellow, is depressed and the light is on. The second button, yellow, is not depressed and the light is not on. The third button, orange, is depressed and the light is on. This third orange button has a heading of Sub and the label is bracketed with the last two pushers, the left one having a label Sub Osc and a scale with 0 at the bottom, 5 half way up and 10 at the top. The pusher is at 10. The final column is labelled Noise and has a scale of 0, 5, 10 again. The pusher is set at 0. HPF has one pusher labelled Freq. The bottom is labelled 0, where the pusher is, the midpoint is 5 and the top 10. All the pushers in the VCF section have 0 at the bottom, 5 in the middle and 10 at the top. The left is labelled Freq and set just below 5. The next pusher is labelled Res and set at 7. There is then a button in the upper position with a label

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(Turn over)

bracket to the next pusher titled Env, set at 7. The next pusher is LFO and set at 0. The last pusher is Kybd at 7.

The VCA section has a two position button and is in the lower position of Gate, rather than the upper of Env.

The ENV section has four pushes with initials as labels. Again the levels are 0 at the bottom, 5 midway and 10 at the top. From left to right the readings are A at 9, D at 7, S at 0, R at 5.

The blue section – Chorus – has three large square buttons, white labelled off, yellow labelled I and with a light off, orange depressed labelled II and with a light on.

(Begin writing your answer on next page)

(Turn over)

(Turn over)

(Turn over)

(Turn over)

(Turn over)

(Turn over)

(TOTAL FOR QUESTION 6 = 20 MARKS)

TOTAL FOR SECTION B = 20 MARKS

TOTAL FOR PAPER = 105 MARKS

END