GCSE MARKING SCHEME

SUMMER 2017

ELECTRONICS - E2
4162/01

INTRODUCTION

This marking scheme was used by WJEC for the 2017 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

GCSE ELECTRONICS - E2

SUMMER 2017 MARK SCHEME

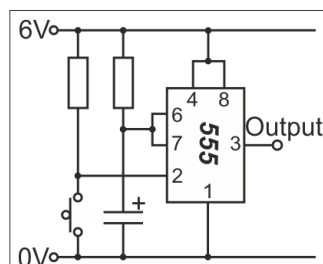1. (a) Double the value of R and keep the value of C unchanged. [1]

   (b) It keeps the time delay unchanged when current flows from the output. [1]

2. (a) (i) B [1]

      (ii) C [1]

      (iii) B [1]

   (b) [1]

3. (a) [1]

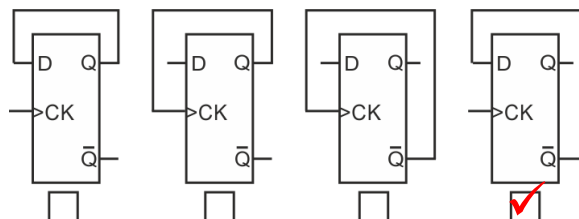| Segments							Character
a	b	c	d	e	f	g	
1	0	0	0	1	1	1	F

   (b) D [1]

4. (a) It resets automatically on the tenth pulse. [1]

   (b) Each output of the counter goes high in turn. [1]

5. (a) When the clock input changes from **0** to **1** [2]
      the $\overline{Q}$ output changes from **1** to **0**.

   (b) Q output goes to logic 1 on the rising edge, exclusively (1) [3]
      Q output then stays at logic 1 (1)
   Q bar opposite to Q (1)

6. (a) [1]

   (b) Q output changes only on rising edges (1) [2]
      Correct orientation (1)

7. (a) Buzzer behaviour in first cycle (1)   [3]
Number of iterations (1)
Motor behaviour over 5s (1)

   (b) (i) 4 times   [1]

       (ii) Necessary - "count is reset" or equivalent (1)   [2]
Problem - "buzzer stays on" or equivalent (1)

8. (a) (i) Loudspeaker   [1]

       (ii) Mixer   [1]

       (iii) Preamplifier   [1]

   (b) Bandwidth   [1]

   (c) 12   [1]

9. (a)   [1]

   (b) 11   [1]

   (c) 6 (Do not allow -6)   [1]

10. (a) 26   [1]

   (b) 35   [1]

11. (a) C = 1, B = 0 and A = 1   [1]

   (b) X = 1 /1 /1 /1 /0 /0   (1)   [2]
Y = 1 /1 /1 /0 /1 /1   (1)

   (c) 4   [1]

   (d) AND gate   [1]

12. Correct transitions (1)   [1]
Correct logic levels (1)
Correct orientation (1)

13.	(a)	(i)	10 000		[1]

13. (a) (i) 10 000 [1]

(ii) 0.0001 [1]

(iii) Accept answers in the range 0.45 - 0.5Hz. [1]

(b) Transitions only on falling edges (1) [3]
Signal A correct (1)
Signal B correct (1)

14. (a) Amplitude = 0.5 V (1) [3]
Period = 0.4 ms (Frequency = 2.5 kHz) (1)
Phase = inverted (1)
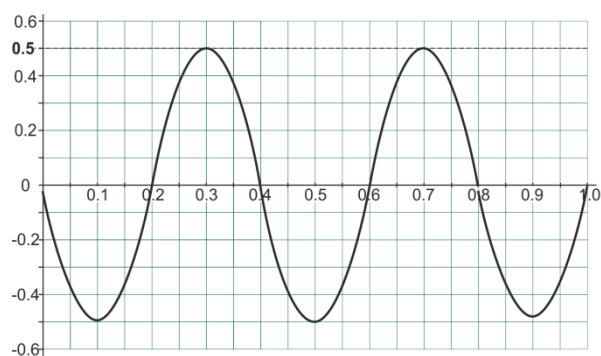
(b) A = 20 kΩ horizontal resistor (1) [3]
B = 100 kΩ horizontal resistor (1)
C = vertical wire (1)
Incorrect gain - subtract 1 mark

15. (a) A = thermistor (or variable resistor) (1) [3]
B = variable resistor (or thermistor) (1)
Correct orientation (1)

(b) (i) 10 V [1]

(ii) 5.0 kΩ [1]

(iii) 100 mA [1]