Christ Church Grammar School

MATHEMATICS METHODS Year 11

Section Two:
Calculator-assumed

Your name _____

Teacher's name _____

Time and marks available for this section

Working time for this section:	25 minutes
Marks available:	21 marks

Materials required/recommended for this section

To be provided by the supervisor
This Question/Answer Booklet
Formula Sheet (retained from Section One)

To be provided by the candidate
Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: drawing instruments, templates and up to three calculators approved for use in this assessment

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Instructions to candidates

1. The rules of conduct of the CCGS assessments are detailed in the Reporting and Assessment Policy. Sitting this assessment implies that you agree to abide by these rules.

2. Write your answers in this Question/Answer Booklet using a blue/black pen. Do not use erasable or gel pens.

3. Answer all questions.

4. You must be careful to confine your response to the specific question asked and to follow any instructions that are specified to a particular question.

5. Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

6. **Show all your working clearly**. Your working should be in sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than two marks, valid working or justification is required to receive full marks. If you repeat an answer to any question, ensure that you cancel the answer you do not wish to have marked.

7. It is recommended that **you do not use pencil**, except in diagrams.
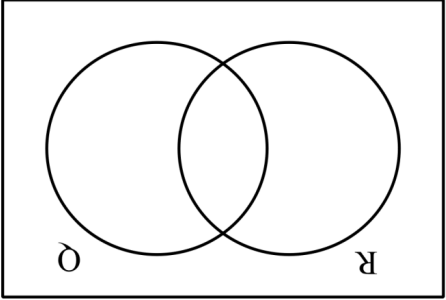
Question 6 (3 marks)

Shade the region indicated by

(a) $R \cup \overline{Q}$ (1 mark)

(b) $A \cap (\overline{B \cup C})$ (2 marks)

Question number: _____
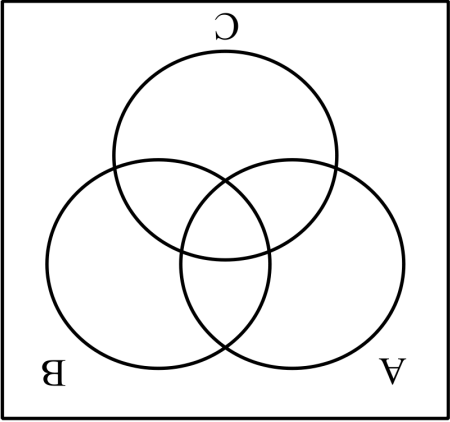
Additional working space

Question 7 **(8 marks)**

The following information regarding events A and B is known.

$$P(A) = \frac{3}{10} \qquad\qquad P(B) = \frac{1}{2} \qquad\qquad P(A|B) = \frac{2}{5}$$

(a) Complete the Venn diagram below. (2 marks)
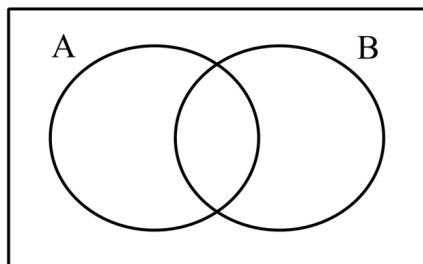
(b) Determine

(i) $P(\overline{A})$ (1 mark)

(ii) $P(A \cap B)$ (1 mark)

(iii) $P(A \cap \overline{B})$ (1 mark)

See next page

Question 7 continued

(c)   Justify if the events A and B are mutually exclusive.   (1 mark)

(d)   Justify if the events A and B are independent.   (2 marks)

Additional working space

Question number: _____

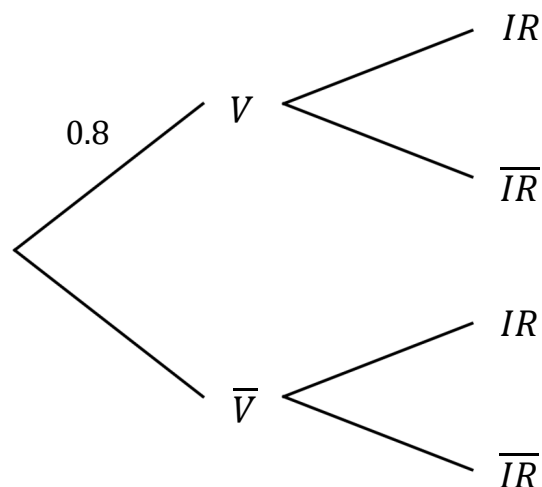**Question 8** (10 marks)

A DIY robot assembly kit has two main electronic features that can either work or be defective because of operator error when assembled. The features are Voice Recognition Command (V) and Infra-red Obstacle Avoidance (IR). The Voice Recognition Command feature works 80% of the time. The probability that both will work is 0.72 and the probability that both will be defective is 0.03.

(a) Complete the tree diagram with the correct probabilities on each branch.

(3 marks)

(b) Determine the probability that the Infra-red Obstacle Avoidance works. (2 marks)

Question 8 continued

(c) Determine the probability that only one feature works. (2 marks)

(d) Given that only one feature works, justify whether it is more likely that the Voice Recognition Command or the Infra-red Obstacle Avoidance is the component that works. (3 marks)