

Retrospective

2016 Queensland Core Skills Test

Short Response (SR) (Part 2 of 5)



For all Queensland schools

Short Response (SR)

This year's SR subtest comprised 16 items across nine units. As students worked through each unit, they interacted with stimulus material, which was chosen to be challenging and engaging. Test developers paid careful attention to framing each item in a way that made it accessible to most students. The SR testpaper comprised units with stimulus material selected from fields such as mathematics, science, history, the social sciences and literature.

This year's paper was varied in its content, covering a broad range of CCEs. The different tasks included determining cost, ratios, materials for a job, designing to specifications, measuring carefully and constructing circles, interpreting advertisements, creating a play-on-words, providing clear explanations and describing how an actor could convey meaning.

Model responses and commentaries on student performance

What follows is an item-by-item report that includes model responses and marking schemes, tables and graphs of the distributions of grades, and commentaries that discuss the tasks. At times, references to specific student responses are included to exemplify observations. As much as possible, model responses are actual student responses. Model responses are those that demonstrate a high level of performance and would have been awarded the highest grade.

For some items, especially the more open-ended ones, responses were extremely varied. For these responses it is not possible to provide examples of the many ways students responded. The detailed, item-specific marking schemes indicate the scope of acceptable responses for different grades. Even for the more closed items the marking schemes demonstrate that different ways of perceiving 'the solution' were able to gain credit.

Marking schemes

The marking schemes used during the marking operation and included in this section of the *Retrospective* are not designed to be read in isolation. They are only one element of the marking prescription. During the marking operation, markers undergo rigorous training in how to apply the marking schemes to student responses of one marking unit. The training involves careful consideration and application of the material presented by immersers.

All SR items are double marked. This means that a student's response booklet is marked by at least 10 different, independent markers. Referee marking also occurs when necessary.

For organisational purposes during the marking operation, the testpaper units were grouped into five marking units. In 2016, Marking Unit 1 contained testpaper units One and Seven, Marking Unit 2 contained testpaper units Two and Eight, Marking Unit 3 contained testpaper units Three and Five, Marking Unit 4 contained testpaper units Four and Six and Marking Unit 9 contained testpaper unit Nine.

Each marking scheme provides descriptors for up to five creditable grades, as well as the non-contributory grades N (where the response is unintelligible or does not satisfy the requirements of any other grade) and O (where no response has been given).

SR 2016 summary

Unit	Item	Basket	Common Curriculum Elements by unit
One <i>Drafts</i>	1	π	10 <i>Using vocabulary appropriate to a context</i> 52 <i>Searching and locating ... information</i>
Two <i>Syrups</i>	2	ϕ	16 <i>Calculating with or without calculators</i> 17 <i>Estimating numerical magnitude</i>
	3	ϕ	37 <i>Applying a progression of steps to achieve the required answer</i> 44 <i>Synthesising</i>
Three <i>Tom S</i>	4	α	4 <i>Interpreting the meaning of words ...</i> 10 <i>Using vocabulary appropriate to a context</i> 26 <i>Explaining to others</i>
	5	β	31 <i>Interrelating ... themes ...</i> 46 <i>Creating/composing/devising</i>
Four <i>Blocks</i>	6	β	16 <i>Calculating with or without calculators</i> 20 <i>Setting out/presenting/arranging/displaying</i> 43 <i>Analysing</i>
	7	π	50 <i>Visualising</i> 53 <i>Observing systematically</i>
Five <i>Blurb</i>	8	θ	11 <i>Summarising/condensing written text</i> 31 <i>Interrelating ideas/themes/issues</i> 44 <i>Synthesising</i>
Six <i>Windows</i>	9	ϕ	16 <i>Calculating with or without calculators</i> 19 <i>Substituting in formulae</i> 32 <i>Reaching a conclusion which is necessarily true provided a given set of assumptions is true</i>
	10	α	37 <i>Applying a progression of steps to achieve the required answer</i> 43 <i>Analysing</i> 57 <i>Manipulating/operating/using equipment</i>
Seven <i>Smoking</i>	11	α	4 <i>Interpreting the meaning of words ...</i> 5 <i>Interpreting the meaning of ... illustrations</i> 26 <i>Explaining to others</i> 27 <i>Expounding a viewpoint</i>
	12	θ	31 <i>Interrelating</i> 43 <i>Analysing</i> 48 <i>Justifying</i>
Eight <i>Sprinklers</i>	13	ϕ	2 <i>Finding material in an indexed collection</i> 17 <i>Estimating numerical magnitude</i> 22 <i>Structuring ... a mathematical argument</i>
	14	θ	35 <i>Extrapolating</i> 37 <i>Applying a progression of steps to achieve the required answer</i> 44 <i>Synthesising</i>
Nine <i>Students</i>	15	θ	12 <i>Compiling lists ...</i> 26 <i>Explaining to others</i> 28 <i>Empathising</i> 33 <i>Inferring</i>
	16	α	43 <i>Analysing</i> 52 <i>Searching and locating ... information</i> 55 <i>Gesturing</i>

Note: CCEs specific to an item are listed on the item's marking scheme.
The baskets into which CCEs are grouped are shown in Appendix 3.

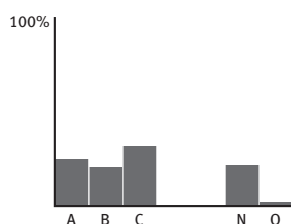
Unit One

The item in this unit is based on an extract describing a walk through part of an Australian city. The following table shows the percentage of responses awarded the various grades for the item in this unit.

	A	B	C	D	E	N	O
Item 1	24.6	20.3	31.7			21.6	1.8
A shaded box indicates that the grade was not available for that item.							

Item 1

Commentary



Item 1 is a two-star item that tested achievement in CCEs 10 *Using vocabulary appropriate to a context* and 52 *Searching and locating ... information*.

This item required students to find the best match from the extract for the given phrases.

An A-grade response needed to provide five exact phrases matched correctly.

In some responses, more words than were needed to match the given phrase were provided and this did not show full command of vocabulary.

Students should remember that it is important to follow the directions in the stem. When directed to provide exact phrases, students should not give extra words.

Model response

first-draft phrase	phrase used in the extract
sun-drenched expanses	(for) <i>shadeless miles</i>
peripheral mercantile areas	(of) <i>marginal commercial districts</i>
strange but dreary incentives	<i>surreally unappealing inducements</i>
pleasant secluded suburb	(a) <i>lovely hidden borough</i>
imposing distinction	(often) <i>impressive venerability</i>

UNIT ONE

ITEM 1

Marking Scheme

PERFORMANCE DOMAIN	10 Using vocabulary appropriate to a context	52 Searching and locating ... information
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A
<p>The response provides</p> <ul style="list-style-type: none"> the five exact phrases matched correctly.

B
<p>The response provides</p> <ul style="list-style-type: none"> four exact phrases matched correctly. <p style="text-align: center;">— OR —</p> <p>The response provides</p> <ul style="list-style-type: none"> three exact phrases matched correctly and, additionally, allowing for at most one missing word each, two of the required phrases matched correctly.

C
<p>The response provides</p> <ul style="list-style-type: none"> two exact phrases matched correctly. <p style="text-align: center;">— OR —</p> <p>The response, allowing for at most one missing word each, provides</p> <ul style="list-style-type: none"> four of the required phrases matched correctly.

N
<p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>

O
<p>No response has been made at any time.</p>

Model Response:

first-draft phrase	phrase used in the extract
... sun-drenched expanses	(for) shadeless miles
... peripheral mercantile areas	(of) marginal commercial districts
... strange but dreary incentives	surreally unappealing inducements
... pleasant secluded suburb	(a) lovely hidden borough
... imposing distinction	(often) impressive venerability

Notes:

- The only acceptable additional word for each phrase is shown in brackets in the model response.
- As long as the word is unambiguously recognisable, incorrect spelling is tolerated.
- Matching the exact phrase correctly other than by writing the words in the space provided, is only acceptable when the match is unambiguous.

Unit Two

The items in this unit are based on the costs and mixes of three different cordial syrups.

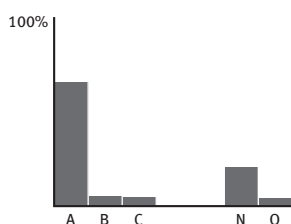
The following table shows the percentage of responses awarded the various grades for the items in this unit.

	A	B	C	D	E	N	O
Item 2	65.2	5.3	4.9			20.5	4.1
Item 3	19.4	7.7	22.8	2.7		35.4	12.1

A shaded box indicates that the grade was not available for that item.

Item 2

Commentary



Item 2 is a two-star item that tested achievement in CCE 16 *Calculating with or without calculators*.

This item presented students with a table showing three different cordial syrups, the volumes of the bottles they are sold in and their prices. Columns to record the price per 100 mL of syrup, the recommended mix (in terms of parts of water per one part of cordial syrup) and the cost of a 250 mL drink of the prepared cordial are also part of the table. Students were required to find the price per 100 mL of two of the syrups.

The cue instructed students to show all steps and to give the prices in cents.

An A-grade response needed to show working that resulted in the correct price, in cents, for the syrups named Fresola and Cherizade.

Some responses gave answers in dollars rather than the cents required by the cue and thus could not be awarded the highest grade.

Rates problems always require correct placement of the quantities being compared. The rate required, i.e. cents per 100 mL (cost divided by volume), was in some responses replaced by mL per cent (volume divided by cost). Using the required units of measurement, A per B always means quantity A divided by quantity B. It is always important to check any results for reasonableness.

Model response

Based on the bottle size and the selling price of Fresola and Cherizade, find the price per 100 mL of each of those syrups.

Show all steps.	2500 mL costs \$4.36	1500 mL costs \$3.95
Give the prices in cents.	100 mL costs x	100 mL costs x
	$x = 100 \div 2500 \times 436$	$x = 100 \div 1500 \times 395$
	$= 17.44 c$	$= 26.33 c$
	cost of 100 mL of Fresola = 17.4 c	cost of 100 mL of Cherizade = 26.3 c

UNIT TWO

ITEM 2

Marking Scheme

PERFORMANCE DOMAIN	16 Calculating with or without calculators		
<p>A</p> <p>The response provides working resulting in</p> <ul style="list-style-type: none"> the correct price for Fresola in cents the correct price for Cherizade in cents. <p>No incorrect information or working is used to obtain the answers.</p>	<p>B</p> <p>The response provides</p> <ul style="list-style-type: none"> the correct price for Fresola in cents or dollars the correct price for Cherizade in cents or dollars. <p>OR</p> <p>The response, allowing for at most one observable mechanical error and consequentially correct working as applicable, provides</p> <ul style="list-style-type: none"> a price for Fresola given in cents or dollars a price for Cherizade given in cents or dollars. 	<p>C</p> <p>The response provides</p> <ul style="list-style-type: none"> the correct price for Fresola in cents or dollars. <p>OR</p> <p>The response provides</p> <ul style="list-style-type: none"> the correct price for Cherizade in cents or dollars. <p>OR</p> <p>The response provides for both Fresola and Cherizade</p> <ul style="list-style-type: none"> evidence of the relevant price divided by the corresponding volume. 	<p>N</p> <p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
			<p>O</p> <p>No response has been made at any time.</p>

Notes:

- The correct price per 100 mL for Fresola in cents is 17.44, 17.4 or 17.
- The correct price per 100 mL for Cherizade in cents is 26.3 recurring, 26.3 or 26.
- The correct price per 100 mL for Fresola in dollars is \$0.1744, \$0.174 or \$0.17.
- The correct price per 100 mL for Cherizade in dollars is \$0.263 recurring, \$0.263 or \$0.26.
- An observable mechanical error is a transcription error; an incorrect result to a correctly stated operation or inappropriate rounding.
- Appropriate movement of the decimal point without a stated operation is acceptable.

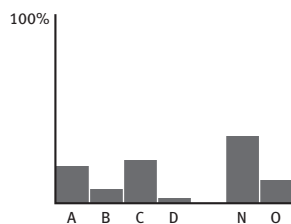
Model Response:

2500 mL costs \$4.36
 100 mL costs x
 $x = 100 \div 2500 \times 4.36 = 17.44 \text{ c}$
 cost of 100 mL of Fresola = 17.4 c

1500 mL costs \$3.95
 100 mL costs x
 $x = 100 \div 1500 \times 3.95 = 26.33 \text{ c}$
 cost of 100 mL of Cherizade = 26.3 c

Item 3

Commentary



Item 3 is a three-star item that tested achievement in CCEs 17 *Estimating numerical magnitude*, 44 *Synthesising* and 37 *Applying a progression of steps to achieve a required answer*.

This item comprised two parts. In the first part, students were required to calculate the cost of a 250 mL drink of cordial using Fresola syrup with the recommended mix stated in the table. In the second part, students had to determine the mix that should be recommended for Cherizade, so that the cost for a 250 mL drink of this cordial would be 9.4 cents.

The cue for the first part directed students to show all steps and to give the cost in cents. In the second part, the students were directed to show all steps again and to make their reasoning clear.

An A-grade response needed to show correct working for the first part that provided the correct cost of the 250 mL of Fresola in cents and, for the second part, provided the recommended mix of 6 parts water to 1 part syrup. The reasoning needed to be evident and clear and no incorrect information, calculations or reasoning could be used to obtain the answers.

Responses showed a variety of methods were used in the two parts of this item. For the first part, the knowledge of ratio was demonstrated when the mix of 4:1 was correctly interpreted as needing to find one-fifth of 250 mL as the amount of syrup in the cordial drink to then be able to calculate the cost. In the second part, one of the many valid methods that could be used to find the recommended mix was to reverse the procedure used in the first part. Once again it was necessary to understand the concept of ratio as a fraction.

Students should expect that the calculations or steps used in the first part of an item could be useful in determining the solution to the second part as this is generally how items with multiple parts are constructed. This is helpful with time management.

Model response

- I.** Calculate the cost of a 250 mL drink of cordial made using Fresola syrup. Assume that the recommended mix is used.

Show all steps. *mix 4 parts water to 1 part syrup therefore 5 parts in total*

Give the cost in cents. *volume of syrup in the drink = 250 mL ÷ 5 parts = 50 mL/part*

cost of syrup per mL = 436 c ÷ 2500 mL = 0.1744 c/mL

cost of drink = 0.1744 × 50 = 8.72 c

- II.** Determine the mix that should be recommended for Cherizade so that the cost for a 250 mL drink of cordial made using that syrup would be 9.4 cents.

Show all steps. *cost of syrup per mL = 395 c ÷ 1500 mL = 0.2633 c/mL*

Make your reasoning clear. *volume of syrup in a drink = 9.4 c ÷ 0.2633 c/mL = 35.7 mL*

parts in a drink = 250 mL ÷ 35.7 mL = 7.0027

so there are 7 parts each of 35.7 mL, one of which is syrup

parts of water = 7 - 1 = 6 parts

the recommended mix is 6 parts water to 1 part syrup

UNIT TWO

ITEM 3

Marking Scheme

PERFORMANCE DOMAIN	44 Synthesising
17 Estimating numerical magnitude	
37 Applying a progression of steps to achieve the required answer	

A	B	C	D	N
<p>The response shows correct working that for part I provides</p> <ul style="list-style-type: none"> the correct cost of the 250 mL drink of Fresola in cents <p>for part II provides</p> <ul style="list-style-type: none"> the recommended mix of 6 parts water to 1 part syrup. <p>The reasoning is evident and clear.</p> <p>No incorrect information, calculations or reasoning are used to obtain the answers.</p>	<p>The response shows correct working that for part I provides</p> <ul style="list-style-type: none"> the correct cost of the 250 mL drink of Fresola in cents or dollars <p>for part II provides</p> <ul style="list-style-type: none"> the 250 mL drink comprises 7 parts of water and syrup. <p>The reasoning is evident and clear.</p> <p>No incorrect information, calculations or reasoning are used to obtain the credible parts of the answers.</p> <p style="text-align: center;">OR</p> <p>The response, allowing for at most one observable mechanical error and any consequentially correct working as applicable,</p> <p>for part I provides</p> <ul style="list-style-type: none"> a cost of the 250 mL drink of Fresola in cents or dollars <p>for part II provides</p> <ul style="list-style-type: none"> a mix of water to syrup. <p>Some indication of what is being calculated is provided.</p> <p>No incorrect reasoning is used to obtain the answers.</p>	<p>The response shows correct working that for part I provides</p> <ul style="list-style-type: none"> the correct cost of the 250 mL drink of Fresola in cents or dollars. <p style="text-align: center;">OR</p> <p>The response</p> <p>for part I, allowing for at most one observable mechanical error and any consequentially correct working as applicable, provides</p> <ul style="list-style-type: none"> a cost of the 250 mL drink of Fresola in cents or dollars. <p style="text-align: center;">OR</p> <p>The response</p> <p>for part II provides</p> <ul style="list-style-type: none"> some correct working that could be used to obtain the recommended mix. 	<p>The response is unintelligible or does not satisfy the requirements for any other grade.</p>	<p style="text-align: center;">O</p> <p>No response has been made at any time.</p>

Notes:

- The reasoning is evident and clear if no inferences need be made.
- The correct cost of the 250 mL drink of Fresola in cents is 8.72, 8.7, 8.5 or 9.
- The correct cost of the 250 mL drink of Fresola in dollars is \$0.0872, \$0.087, \$0.085 or \$0.09.
- An observable mechanical error is a transcription error; an incorrect result to a correctly stated operation or inappropriate rounding.

Model Response:

- mix 4 parts water to 1 part syrup therefore 5 parts in total volume of syrup in the drink = $250 \text{ mL} \div 5 \text{ parts} = 50 \text{ mL/part}$
 cost of syrup per mL = $436 \text{ c} \div 2500 \text{ mL} = 0.1744 \text{ c/mL}$
 cost of drink = $0.1744 \times 50 = 8.72 \text{ c}$
- cost of syrup per mL = $395 \text{ c} \div 1500 \text{ mL} = 0.2633 \text{ c/mL}$
 volume of syrup in a drink = $9.4 \text{ c} \div 0.2633 \text{ c/mL} = 35.7 \text{ mL}$
 parts in a drink = $250 \text{ mL} \div 35.7 \text{ mL} = 7.0027$
 so there are 7 parts each of 35.7 mL, one of which is syrup
 parts of water = $7 - 1 = 6 \text{ parts}$
 the recommended mix is 6 parts water to 1 part syrup

Unit Three

The items in this unit are based on a type of deliberate play-on-words called Tom Swiftlys. The name is based on the way the main character spoke in a series of adventure stories written in the early 1900s.

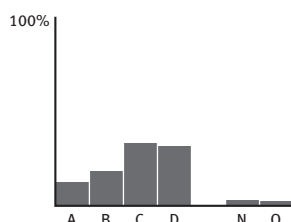
The following table shows the percentage of responses awarded the various grades for the items in this unit.

	A	B	C	D	E	N	O
Item 4	12.3	18.1	33.0	31.7		2.6	2.4
Item 5	5.6	21.0	57.6	11.4		2.1	2.3

A shaded box indicates that the grade was not available for that item.

Item 4

Commentary



Item 4 is a three-star item that tested achievement in CCEs 4 *Interpreting the meaning of words*, 10 *Using vocabulary appropriate to a context* and 26 *Explaining to others*.

The introduction to this unit familiarised students with the concept of a Tom Swiftly. Two examples were given and analysed. These acted as models to assist students when answering the item. This item required students to analyse two given Tom Swiftlys.

An A-grade response required, for each Tom Swiftly, provision of an appropriate meaning for the adverb, an explanation of a suitable context for speaking in the manner of the adverb and a suitable link between the stem of the adverb and the spoken words.

The meaning given for the adverb had to make sense according to the particular Tom Swiftly and the context needed to address the reason for the words to be spoken that way, e.g. as a (blunt) demand for the sharpener or viewing one's appearance in the mirror (reflectively).

Students should make use of any models given in the stimulus of an item and use these to provide a structure for their responses.

Model response

Analyse the two Tom Swiftlys that follow. Use the examples above as a guide.

'I need your pencil sharpener!' Tom said bluntly.

MEANING OF ADVERB AND WHY IT IS SUITABLE —

'Bluntly' can mean very direct and serious. In the context of asking for something that is needed desperately, that is how Tom could say those words.

LINK TO THE SPOKEN WORDS —

Blunt is a description a pencil is given when it needs to be sharpened.

'I don't like the way I look in that mirror,' Tom said reflectively.

MEANING OF ADVERB AND WHY IT IS SUITABLE —

'Reflect' can mean to critique with the benefit of hindsight. Since Tom is looking into a mirror and he would be critiquing his own image, that is how Tom could say those words.

LINK TO THE SPOKEN WORDS —

A reflection is something a mirror produces.

UNIT THREE

ITEM 4

Marking Scheme

4 Interpreting the meaning of words ... 10 Using vocabulary appropriate to a context	
26 Explaining to others	
PERFORMANCE DOMAIN	
A	<p>The response, for each Tom Swifty, provides</p> <ul style="list-style-type: none"> • an appropriate meaning for the adverb • an explanation of a suitable context for speaking in the manner of the adverb • a suitable link between the stem of the adverb and the spoken words. <p>No incorrect or contradictory statements are made.</p>
B	<p>The response, for one Tom Swifty, provides</p> <ul style="list-style-type: none"> • an appropriate meaning for the adverb • an explanation of a suitable context for speaking in the manner of the adverb • a suitable link between the stem of the adverb and the spoken words. <p>No incorrect or contradictory statements are made.</p> <p style="text-align: center;"><i>AND</i></p> <p>The response, for the other Tom Swifty, provides</p> <ul style="list-style-type: none"> • an appropriate meaning for the adverb <p>and EITHER</p> <ul style="list-style-type: none"> • an explanation of a suitable context for speaking in the manner of the adverb <p>OR</p> <ul style="list-style-type: none"> • a suitable link between the stem of the adverb and the spoken words.
C	<p>The response, for one Tom Swifty, provides</p> <ul style="list-style-type: none"> • an appropriate meaning for the adverb • an explanation of a suitable context for speaking in the manner of the adverb • a suitable link between the stem of the adverb and the spoken words. <p>No incorrect or contradictory statements are made.</p> <p style="text-align: center;">OR</p> <p>The response, for each Tom Swifty provides TWO of</p> <ul style="list-style-type: none"> • an appropriate meaning for the adverb • an explanation of a suitable context for speaking in the manner of the adverb • a suitable link between the stem of the adverb and the spoken words.
D	<p>The response, across the two Tom Swiftys, provides TWO of</p> <ul style="list-style-type: none"> • an appropriate meaning for the adverb • an explanation of a suitable context for speaking in the manner of the adverb • a suitable link between the stem of the adverb and the spoken words.
N	<p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
O	<p>No response has been made at any time.</p>

Note:

1. An adverb cannot be explained in terms of itself.

Model Response:

'I need your pencil sharpener!' Tom said bluntly.

MEANING OF ADVERB AND WHY IT IS SUITABLE —

'Bluntly' can mean very direct and serious. In the context of asking for something that is needed desperately, that is how Tom could say those words.

LINK TO THE SPOKEN WORDS —

Blunt is a description a pencil is given when it needs to be sharpened.

'I don't like the way I look in that mirror,' Tom said reflectively.

MEANING OF ADVERB AND WHY IT IS SUITABLE —

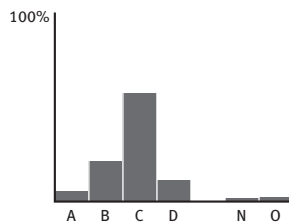
'Reflect' can mean to critique with the benefit of hindsight. Since Tom is looking into a mirror and he would be critiquing his own image, that is how Tom could say those words.

LINK TO THE SPOKEN WORDS —

A reflection is something a mirror produces.

Item 5

Commentary



Item 5 is a three-star item that tested achievement in CCEs 31 *Interrelating ... themes*, 46 *Creating/composing* and 10 *Using vocabulary appropriate to a context*.

This item comprised two parts. In the first part, for each of the given sentences students were required to select the most suitable adverb (from the list in the highlighted section) to complete the sentence as a Tom Swiftly.

In the second part, students had to craft appropriate spoken words to form a Tom Swiftly that ends with 'Tom said softly'. The cue for this part instructed students to check that their words did indeed create a Tom Swiftly as described in this unit.

An A-grade response needed, for the first part, to correctly match all five adverbs and then for the second part to create a Tom Swiftly using a single sentence. The spoken words needed to set up a context in which the words would most likely be said in a quiet or gentle voice and a link to the word 'soft'.

To correctly match the adverbs students had to be sure the adverb and the spoken words did form a Tom Swiftly as defined in the introduction. In the second part many of the spoken words provided in the responses contained something soft but did not provide the context for why those words would be said quietly or gently. Some responses did not set up a link with the word 'soft'.

Students should use all available information and attend to any cues carefully. If a model is given use it to help respond appropriately.

Model response

- I. For each sentence below, select the most suitable adverb (from the highlighted section) to complete the sentence as a Tom Swiftly. Write **one** adverb at the end of each sentence. Do not use any adverb from the highlighted section more than once.

briefly diplomatically encouragingly listlessly meanly presently quickly sharply stridently

'Watch out for the broken glass,' Tom said ... **sharply**.

'Your work is only average,' Tom said ... **meanly**.

'Walk this way,' Tom said ... **stridently**.

'I can't remember what groceries I need to buy,' Tom said ... **listlessly**.

'Of course you'll graduate,' Tom said ... **diplomatically**.

- II. Craft appropriate spoken words to go before *Tom said softly*, to form a Tom Swiftly.

Check that your words do create a Tom Swiftly as described in this unit.

' I could just sink into this cosy bed forever,
.....
.....
.....
..... ' Tom said softly.

UNIT THREE

ITEM 5

Marking Scheme

PERFORMANCE DOMAIN	31 Interrelating ... themes ...	46 Creating/composing/devising
	10 Using vocabulary appropriate to a context	

A	B	C	D	N
<p>The response, for part I, provides</p> <ul style="list-style-type: none"> the five adverbs matched correctly <p><i>AND</i></p> <p>for part II, sets up</p> <ul style="list-style-type: none"> a context in which the words would most likely be said in a quiet or gentle voice a link to the word 'soft'. <p>The single sentence creates a Tom Swifty as defined.</p>	<p>The response, for part I, provides</p> <ul style="list-style-type: none"> four of the adverbs matched correctly <p><i>AND</i></p> <p>for part II, sets up</p> <ul style="list-style-type: none"> a context in which the words would most likely be said in a quiet or gentle voice a link to the word 'soft'. <p>The single sentence creates a Tom Swifty as defined.</p> <p style="text-align: center;">OR</p> <p>The response, for part I provides</p> <ul style="list-style-type: none"> the five adverbs matched correctly <p><i>AND</i></p> <p>for part II sets up</p> <ul style="list-style-type: none"> a link to the word 'soft'. 	<p>The response, for part I, provides</p> <ul style="list-style-type: none"> four of the adverbs matched correctly. <p style="text-align: center;">OR</p> <p>The response, for part I, provides</p> <ul style="list-style-type: none"> three of the adverbs matched correctly <p><i>AND</i></p> <p>for part II, sets up ONE of</p> <ul style="list-style-type: none"> a context in which the words would most likely be said in a quiet or gentle voice a link to the word 'soft' a reference to something that could be deemed to be 'soft'. 	<p>The response, for part I, provides</p> <ul style="list-style-type: none"> two of the adverbs matched correctly. <p style="text-align: center;">OR</p> <p>The response, for part II, sets up ONE of</p> <ul style="list-style-type: none"> a context in which the words would most likely be said in a quiet or gentle voice a link to the word 'soft' a reference to something that could be deemed to be 'soft'. 	<p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
				O
				No response has been made at any time.

Model Response:

- I.
- sharply
 - meanly
 - stridently
 - listlessly
 - diplomatically
- II.

'I could just sink into this cosy bed forever,' Tom said softly.

UNIT THREE ITEM 5

Marking Scheme

Notes:

Part I:

1. An adverb cannot gain credit if it is used more than once, even if one of the uses involves a correct match.
2. As long as the word is unambiguously recognisable, incorrect spelling is tolerated.
3. A correct match may be indicated other than by writing the adverb at the end of the sentence (e.g. by connecting lines) as long as what is meant is unambiguous. This applies to all grades.

Part II:

4. In making judgments about whether a Tom Swifty has been formed, markers should analyse the response as modelled in the stimulus material, that is, consider whether it is most likely that Tom would say the words in a quiet or gentle voice (echoing the meaning of softly) and whether the spoken words link with the stem of the adverb, 'soft'.

Ask: 'If [something in the spoken words] then would it be soft?'

Some examples:

- 'I love sinking into my mattress at the end of a long day,' Tom said softly.
This is a Tom Swifty. Context: Because Tom is thinking of relaxing he would most likely say the words gently. Link: If he is sinking into a mattress then it would be soft.
 - 'The chef should have used a mallet on this mutton before serving it up as 'lamb', Tom said softly.
This is a Tom Swifty. Context: Because Tom is criticising the food in a restaurant he would most likely speak quietly. Link: If a mallet is used on meat (i.e. to tenderise it) then the meat would be soft.
 - 'The sentence the judge just gave is lenient,' Tom said softly.
This is a Tom Swifty. Context: If Tom is in the court room and is disagreeing with a judge he would say the words quietly. Link: If the sentence is lenient then it is soft.
5. The word 'soft' in a response to part II does not set up a link or a reference to something that could be deemed to be soft. Consider the rest of the response when making a judgment about a grade.
 6. A Tom Swifty comprises a single sentence. If more than one sentence is included, consider the response as a whole to determine whether a context, link or reference has been set up.
 7. If multiple attempts are made to create a Tom Swifty, consider only the first when making a judgment about a grade.

Unit Four

The items in this unit are based on water features made up of square-based metal blocks of varying heights arranged on rectangular grids.

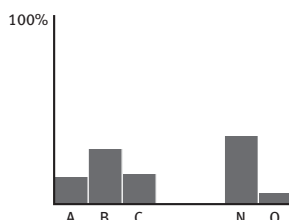
The following table shows the percentage of responses awarded the various grades for the items in this unit.

	A	B	C	D	E	N	O
Item 6	13.9	29.0	15.8			35.7	5.6
Item 7	21.2	8.3	31.0	23.1		10.1	6.3

A shaded box indicates that the grade was not available for that item.

Item 6

Commentary



Item 6 is a two-star item that tested achievement in CCEs 50 *Visualising* and 16 *Calculating with or without calculators*.

This item required students to find the maximum and minimum depths of water in the pool formed in one of the water-feature models and then to state where each of those depths occurs.

The cue directed students to give the depths in centimetres.

An A-grade response needed to provide the maximum depth and where it occurred and the minimum depth and where it occurred.

To obtain the answer it was necessary to visualise water in the pool and recognise that once the pool was as full as it could be the water would flow out over the lowest side block (in the model given, block 7). When this happened the water on top of block 1 would have a depth of 6 ($7 - 1$) cm and water on top of block 3 would have a depth of 4 ($7 - 3$) cm. In some responses it was not made clear where the maximum and minimum depths occurred nor were values identified as maximum and minimum.

Students should clearly and unambiguously provide all requirements when responding to items.

Model response

Assume that the pool formed in model 2 is as full as it can be, i.e. it is holding the greatest amount of water that it can. Find the maximum and minimum **depths** of the water in the pool and state where each occurs.

Give the depths in centimetres.

Maximum level of water is 7. Minimum depth is on block 3.

Maximum depth is on block 1. Minimum depth is $7 - 3 = 4$

Maximum depth is $7 - 1 = 6$

UNIT FOUR ITEM 6

Marking Scheme

PERFORMANCE DOMAIN

50 Visualising

16 Calculating with or without calculators

A	<p>The response provides</p> <ul style="list-style-type: none"> • maximum depth of 6 • maximum depth occurs on block 1 • minimum depth of 4 • minimum depth occurs on block 3. <p>No incorrect information or working is used to obtain the answers.</p>
---	--

B	<p>The response provides</p> <ul style="list-style-type: none"> • depth of 6 which can be inferred to be the maximum • maximum depth occurs on block 1. <p>No incorrect information or working is used to obtain this part of the answer.</p> <p style="text-align: center;">OR</p> <p>The response provides</p> <ul style="list-style-type: none"> • depth of 4 which can be inferred to be the minimum • minimum depth occurs on block 3. <p>No incorrect information or working is used to obtain this part of the answer.</p> <p style="text-align: center;">OR</p> <p>The response provides both</p> <ul style="list-style-type: none"> • depth of 6 which can be inferred to be the maximum • depth of 4 which can be inferred to be the minimum. <p>No incorrect information or working is used to obtain these parts of the answers.</p>
---	--

C	<p>The response provides</p> <ul style="list-style-type: none"> • depth of 6 which can be inferred to be the maximum. <p style="text-align: center;">OR</p> <p>The response provides</p> <ul style="list-style-type: none"> • depth of 4 which can be inferred to be the minimum. <p style="text-align: center;">OR</p> <p>The response provides</p> <ul style="list-style-type: none"> • that the maximum depth and the minimum depth is determined using height of 7. <p style="text-align: center;">OR</p> <p>The response provides</p> <ul style="list-style-type: none"> • maximum depth occurs on block 1 • minimum depth occurs on block 3.
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N	Response is unintelligible or does not satisfy the requirements for any other grade.
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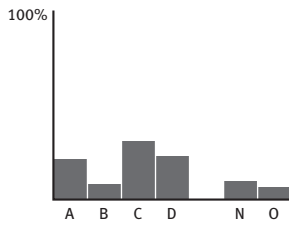
O	No response has been made at any time.
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Model Response:

- Maximum level of water is 7.
- Maximum depth is on block 1.
- Maximum depth is $7 - 1 = 6$
- Minimum depth is on block 3.
- Minimum depth is $7 - 3 = 4$

Item 7

Commentary



Item 7 is a three-star item that tested achievement in CCEs 20 *Setting out/presenting/arranging/displaying*, 43 *Analysing* and 53 *Observing systematically*.

This item required students to design a water feature so that a pool is formed in its middle using blocks numbered 1 to 20, where the numbers indicate the heights of the blocks. There were three requirements: the area of the base of the pool had to be as large as possible; the amount of water able to be held in the pool had to be as great as possible; blocks beside each other had to have height differences more than one, i.e. no consecutively numbered blocks could be beside each other.

The cue suggested that students use pencil on a draft grid before completing their response on the answer grid.

An A-grade response needed blocks numbered 1 to 20 to be used (with no repetition) and those numbered 1 to 6 to be located in the middle squares, 7 to 10 located in the corner squares and 11 to 20 in the side squares. It also required that no consecutive numbers be beside each other. This layout would ensure that the three requirements of the water feature design would be met.

Checking was of paramount importance in this item as some responses that showed correct reasoning unfortunately had consecutive pairs beside each other or repeated numbers in the answer grid.

Students should always consider all given information especially that provided in the introductory stimulus prior to developing their strategies. Model 2 given in the stimulus exemplified how a pool is formed and the connection between the pool blocks and the side blocks.

Model response

Answer grid.

8	13	16	19	10
12	6	2	4	20
18	3	5	1	15
9	17	11	14	7

UNIT FOUR

ITEM 7

Marking Scheme

PERFORMANCE DOMAIN	20 Setting out/presenting/arranging/displaying	43 Analysing
	53 Observing systematically	

A	B	C	D	N
<p>The response provides the numbers 1 to 20 in a correctly completed grid such that numbers</p> <ul style="list-style-type: none"> 1 to 6 occupy the six middle squares 7 to 10 occupy the corner squares 11 to 20 occupy the side squares. <p>No numbers are repeated. No consecutive numbers are beside each other throughout the grid.</p>	<p>The response provides the numbers 1 to 20 in a completed grid such that numbers</p> <ul style="list-style-type: none"> 1 to 6 occupy the six middle squares 7 to 10 occupy corner squares 11 to 20 occupy the side squares. <p>No numbers are repeated. Consecutive numbers are beside each other at most two times throughout the grid.</p> <p style="text-align: center;">OR</p> <p>The response provides the numbers 1 to 20 in a completed grid such that numbers</p> <ul style="list-style-type: none"> 1 to 10 occupy the six middle squares and the corner squares 11 to 20 occupy the side squares. <p>No numbers are repeated.</p>	<p>The response provides the numbers 1 to 20 in a completed grid such that numbers</p> <ul style="list-style-type: none"> 1 to 10 occupy the six middle squares and the corner squares 11 to 20 occupy the side squares. <p>No numbers are repeated.</p> <p style="text-align: center;">OR</p> <p>The response provides the numbers 1 to 20 in a completed grid such that</p> <ul style="list-style-type: none"> the largest middle-square number is less than the smallest side-square number. <p>No numbers are repeated. Consecutive numbers are beside each other at most two times throughout the grid.</p>	<p>The response provides a grid such that six of the numbers 1 to 10</p> <ul style="list-style-type: none"> occupy the six middle squares. <p>No numbers are repeated in the middle squares.</p> <p style="text-align: center;">OR</p> <p>The response provides a grid containing 12 or more numbers between 1 and 20. No numbers are repeated. No consecutive numbers are beside each other throughout the grid.</p>	<p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
				O
				No response has been made at any time.

Model Response:

8	13	16	19	10
12	6	2	4	20
18	3	5	1	15
9	17	11	14	7

Notes:

- | | | |
|--------|--------|--------|
| corner | side | corner |
| side | middle | side |
| corner | side | corner |
- If a square contains more than one number, consider it as an empty square and therefore the response will not be considered a completed grid.
- The response to be graded is the 'answer grid'. If there are no numbers provided in the 'answer grid', refer to the 'draft grid' and grade accordingly.

Unit Five

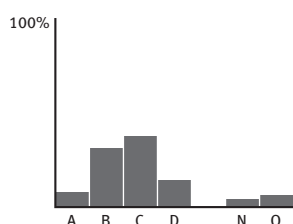
The item in this unit is based on a list of quotations about a particular nonfiction book. The quotations give personal reactions to the book.

The following table shows the percentage of responses awarded the various grades for the item in this unit.

	A	B	C	D	E	N	O
Item 8	7.5	31.2	37.1	14.3		3.9	6.0
A shaded box indicates that the grade was not available for that item.							

Item 8

Commentary



Item 8 is a three-star item that tested achievement in CCEs 44 *Synthesising*, 11 *Summarising/condensing written text* and 31 *Interrelating ideas/themes/issues*.

The stimulus for this item was a number of quotations, each of which gave a personal reaction to the same nonfiction book.

This item required students to determine the facts relating to the essential elements of the nonfiction book and to compose an objective overview. Title,

author, topic, content and style of writing were stipulated as the ‘essential elements’ of the objective overview they were to compose. An objective overview is considered to be one free from personal comments.

A cue suggested using the open space to organise the response and reminded students to write their final overview in the lined area. Other cues instructed students to write in sentences and not to simply quote from the quotations.

An A-grade response needed to create the overview, drawing together evidence from the stimulus, rather than simply quoting verbatim from it. The responses needed to be objective, succinct and coherent and follow a logical sequence. As part of the overview students were required to correctly identify the title, author and topic. They were also required to provide different details about the content and different details about the book’s style.

The title and name of the author were mostly identified but the topic and content were sometimes interchanged. The topic, as distinct from content of the book is ‘public speaking or presenting’, or an equivalent over-arching word or phrase. Many responses identified topic as ‘dos and don’ts of public speaking’, or ‘personal experiences of public speaking’. These are creditable as details of content, but not as the topic of the book.

Students should take on board the suggestion in a cue that recommends organising before writing the final response. This type of cue has been provided because, to respond well, several parts would have to be carefully brought together (synthesised). Attending to cues is always a beneficial exercise — they are there to guide students.

Model response

Write in sentences.	‘Confessions of a Public Speaker’ by Scott Berkun is about public speaking and offers advice
Do not simply quote from the quotations.	on making presentations to an audience. It is well-organised and contains practical suggestions based on the author’s own experiences, making it humorous and entertaining.

UNIT FIVE

ITEM 8

Marking Scheme

PERFORMANCE DOMAIN	44 Synthesising	11 Summarising/condensing written text
<p>31 Interrelating ideas/themes/issues</p> <p>A</p> <p>The response provides an overview which</p> <ul style="list-style-type: none"> draws together evidence from the stimulus, rather than simply quoting verbatim from the stimulus is objective — contains no personal comments is succinct and coherent and follows a logical sequence contains no assumptions that are not supported by the stimulus material correctly identifies <ul style="list-style-type: none"> title as <i>Confessions of a Public Speaker</i> author as Scott Berkun topic as public speaking (or equivalent) gives different details of the book's content gives different details of the book's style. 	<p>B</p> <p>The response provides an overview which</p> <ul style="list-style-type: none"> draws together evidence from the stimulus rather than simply quoting verbatim from the stimulus is objective — contains no personal comments correctly identifies <ul style="list-style-type: none"> title as <i>Confessions of a Public Speaker</i> author as Scott Berkun topic as public speaking (or equivalent) <p>AND gives</p> <p>EITHER</p> <ul style="list-style-type: none"> a detail of the book's content different details of the book's style <p>OR</p> <ul style="list-style-type: none"> different details of the book's content a detail of the book's style. <p>OR</p> <p>The response provides an overview which</p> <ul style="list-style-type: none"> draws together evidence from the stimulus rather than simply quoting verbatim from the stimulus is objective — contains no personal comments correctly identifies <ul style="list-style-type: none"> title as <i>Confessions of a Public Speaker</i> author as Scott Berkun gives different details of the book's content gives different details of the book's style. 	<p>C</p> <p>The response</p> <ul style="list-style-type: none"> correctly identifies TWO of: <ul style="list-style-type: none"> title as <i>Confessions of a Public Speaker</i> author as Scott Berkun topic as public speaking (or equivalent) gives different details of the book's content and/or style. <p>D</p> <p>The response</p> <ul style="list-style-type: none"> correctly identifies TWO of: <ul style="list-style-type: none"> title as <i>Confessions of a Public Speaker</i> author as Scott Berkun topic as public speaking (or equivalent). <p>OR</p> <p>The response gives different details of the book's content and/or style.</p> <p>N</p> <p>Response is unintelligible or does not satisfy the requirements for any other grade.</p> <p>O</p> <p>No response has been made at any time.</p>
<p>Model Responses:</p>		
<ol style="list-style-type: none"> 'Confessions of a Public Speaker' by Scott Berkun is about public speaking and offers advice on making presentations to an audience. It is well-organised and contains practical suggestions based on the author's own experiences, making it humorous and entertaining. In his book, 'Confessions of a Public Speaker', Scott Berkun gives practical and useful advice about speaking in front of an audience. The book is entertaining and covers all that potential public speakers need to know. It is authoritative but uses personal experiences and examples, often humorously. 'Confessions of a Public Speaker', written by Scott Berkun, is a book on public speaking. Scott shares his personal experiences to offer practical insights and tips based on his own successes and mistakes. He does this in a refreshing, humorous and well-organised manner. 		

UNIT FIVE

ITEM 8

Marking Scheme

Notes:

1. An overview presents the essential elements written in sentences (not dot points). An overview is not simply a collection of quotes taken from the stimulus material.
2. The essential elements are:
 - the title of the book (*Confessions of a Public Speaker*)
 - the author (Scott Berkun) — ‘Scott’ on its own or ‘Berkun’ on its own is not sufficient to correctly identify the author
 - topic — the topic is the ‘superset’: public speaking or equivalent such as presenting, guide to giving presentations
 - content — the ‘subsets’ of the topic — See Note 3
 - style — See Note 4.
3. The book’s content includes (but is not limited to these words): real-life experiences, practical tips, successes, mistakes, bad experiences, suggestions, behind-the-scenes information, practical advice on speaking to an audience ...
4. Style is the way in which an author presents the content. The book’s style includes (but is not limited to these words): comprehensive, cohesive, well-organised, humorous, entertaining, fresh, honest, practical, witty, wise ...
5. A detail can be attributed to EITHER content OR style but not both. That is, there is to be no double-dipping. Examples: practical, informative.
6. A response that refers to the book as being fictional or as a novel is not eligible for an A-grade.
7. Working in the area provided for organising a response cannot be considered part of an ‘overview’, but it may provide evidence that can be used to contribute to the award of a C-grade or D-grade. If there is no response in the lined area, the area provided for organising a response should be used to determine the grade.

Unit Six

The items in this unit are based on two lead-light windows of different sizes.

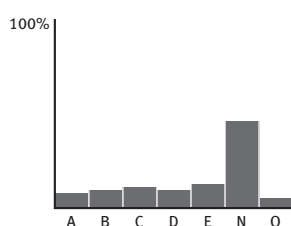
The following table shows the percentage of responses awarded the various grades for the items in this unit.

	A	B	C	D	E	N	O
Item 9	7.8	9.6	10.7	9.1	12.2	45.4	5.2
Item 10	11.6	10.3	5.3	32.3	12.5	16.5	11.4

A shaded box indicates that the grade was not available for that item.

Item 9

Commentary



Item 9 is a four-star item that tested achievement in CCEs 16 *Calculating with or without calculators* and 32 *Reaching a conclusion which is necessarily true provided a given set of assumptions is true*.

This item comprised two parts and required students to find the total length of lead needed to construct a circular lead-light window which contained a square in the centre of the window. In determining this total length, several intermediate values needed to be calculated and two of these intermediate values (i.e. the area of the square and its side-length) needed to be included in the first part of the response.

The cues directed students to show all steps and give each of the answers to three decimal places.

An A-grade response needed to provide evidence that all of the seven key steps were used in a valid way to provide the final results for the area of the square, the side-length of the square and the total length of lead for the window.

Students should not measure a diagram unless it has been explicitly identified as a scale diagram. The diagram provided in the stimulus was clearly non-circular and was described as a 'very rough sketch'. This was deliberate so that it would not be taken to be a scale diagram. If a diagram is not to scale there must be another method of determining the solution.

Model response

- I.** Find the area (in m²) that the square pane of glass will have and then calculate its side-length (in m) if the actual window will have a diameter of 2.20 m.

Show all steps. $\text{Area of circle } \pi r^2 = \pi \times 1.1^2$ $\text{Area of square} = s^2$

Give answers to three decimal places. $= 3.8013 \dots \text{ m}^2$ $0.760 = s^2$

$s = \sqrt{0.760}$

$\text{Area of square} = \frac{3.8013 \dots}{5}$ $= 0.872 \text{ m}$

$= 0.7602 \dots$

$= 0.760 \text{ m}^2$

- II.** For this window, lead will only be used for the sides of the square and the four lines from the corners of the square to the rim of the circle.

Determine the total length of lead to be used for this window.

Show all steps. $\text{Perimeter of square} = s \times 4$

Give final length in metres to three decimal places. $= 0.872 \times 4$

$= 3.488 \text{ m}$

For diagonal: $c^2 = a^2 + b^2$

$c^2 = 0.872^2 + 0.872^2$

$= 1.521$

Diagonal of square = $\sqrt{1.521}$

Length of four lines to rim = $2 \times (2.2 - 1.233)$

$= 1.233$

$= 1.934$

Total lead required = perimeter of square + length of lines to rim

$= 3.488 + 1.934$

$= 5.422 \text{ m.}$

UNIT SIX

ITEM 9

Marking Scheme

PERFORMANCE DOMAIN		16 Calculating with or without calculators	
		32 Reaching a conclusion which is necessarily true provided a given set of assumptions is true	
A	<p>The response shows valid steps for</p> <ul style="list-style-type: none"> • area of circle • area of square • side-length • perimeter of square • section length of diagonal • length of all lines to rim • total length of lead <p><i>AND</i></p> <p>provides final results, given correctly to three decimal places, for</p> <ul style="list-style-type: none"> • area of square (in m²) • side-length (in m) • total length of lead (in m). <p>No incorrect information or working is used to obtain the answers.</p>	B	<p>The response, allowing for at most one observable mechanical error and consequentially correct working as applicable, shows valid steps for</p> <ul style="list-style-type: none"> • area of circle • area of square • side-length • perimeter of square • section length of diagonal • length of lines to rim • total length of lead <p><i>AND</i></p> <p>provides final results for</p> <ul style="list-style-type: none"> • area of square • side-length • total length of lead.
C	<p>The response provides correct results for</p> <ul style="list-style-type: none"> • area of square • side-length • perimeter of square. <p>No incorrect information or working is used to obtain the answers.</p> <p style="text-align: center;">OR</p> <p>The response shows valid steps for</p> <ul style="list-style-type: none"> • area of circle • area of square • side-length • perimeter of square • length of relevant diagonal • length of lines to rim • total length of lead. 	D	<p>The response, allowing for at most one observable mechanical error and consequentially correct working, as applicable, provides results for</p> <ul style="list-style-type: none"> • area of square • side-length • perimeter of square. <p style="text-align: center;">OR</p> <p>The response, based on a stated side-length of the square and allowing for at most one observable mechanical error and consequentially correct working as applicable, provides</p> <ul style="list-style-type: none"> • consequentially correct length of relevant diagonal • consequentially correct total length of lead. <p style="text-align: center;">OR</p> <p>The response, based on a stated length of the diagonal of the square (less than 2.2 m) and allowing for at most one observable mechanical error and consequentially correct working as applicable, provides</p> <ul style="list-style-type: none"> • consequentially correct side of square • consequentially correct total length of lead.
E	<p>The response, allowing for at most one observable mechanical error and consequentially correct working as applicable, provides results for</p> <ul style="list-style-type: none"> • area of square • side-length. <p style="text-align: center;">OR</p> <p>The response provides</p> <ul style="list-style-type: none"> • the correct use of Pythagoras' theorem using stated values for a triangle associated with the square. 	N	<p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
O	<p>No response has been made at any time.</p>		

Notes:

1. An 'observable mechanical error' means that sufficient intermediate steps are shown so that an inference does not need to be made to show how an error occurred. Such errors include:
 - a misuse of units
 - a conversion error
 - a recognisable transcription error
 - an incorrect result of a correctly-stated operation
 - inappropriate rounding.
2. A triangle associated with the square is a right isosceles triangle that is part of the square drawn in the circle.

UNIT SIX

ITEM 9

Marking Scheme

Model Response:

I.

$$\text{Area of circle } \pi r^2 = \pi \times 1.1^2 = 3.8013 \dots \text{ m}^2.$$

$$\text{Area of square} = \frac{3.8013 \dots}{5}$$

$$= 0.7602 \dots$$

$$= 0.760 \text{ m}^2$$

$$\text{Area of square} = s^2$$

$$0.760 = s^2$$

$$s = \sqrt{0.760}$$

$$= 0.872 \text{ m}$$

II.

$$\text{Perimeter of square} = s \times 4$$

$$= 0.872 \times 4$$

$$= 3.488 \text{ m}$$

For diagonal: $c^2 = a^2 + b^2$

$$c^2 = 0.872^2 + 0.872^2$$

$$= 1.521$$

$$\text{Diagonal of square} = \sqrt{1.521}$$

$$= 1.233$$

$$\text{Length of four lines to rim} = 2 \times (2.2 - 1.233)$$

$$= 1.934$$

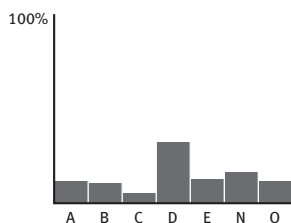
$$\text{Total lead required} = \text{perimeter of square} + \text{length of lines to rim}$$

$$= 3.488 + 1.934$$

$$= 5.422 \text{ m.}$$

Item 10

Commentary



Item 10 is a four-star item that tested achievement in CCEs 57 *Manipulating/operating/using equipment*, 19 *Substituting into formulae*, 37 *Applying a progression of steps to achieve the required answer* and 43 *Analysing*.

This item comprised two parts. In the first part students were required to carefully measure in millimetres the length of the chord and the vertical height of the top segment in the scale diagram. They were to use those measurements in the given formula to find the area of the segment. In the second part they were required to

find the radius for the two circles, each with the same area as the segment. These circles had to be drawn using a compass and positioned in the space between the top and bottom segments.

The cues directed students to show all steps in the first part and give their answer to the nearest square millimetre. In the second part the cue instructed students to show the working used to calculate the radius.

An A-grade response needed to correctly substitute the required values of the height and the chord into the formula and calculate the correct segment area to the nearest square millimetre. The response had to recognise that segment area equals circle area and to accurately construct the two circles within the designated area using the correctly calculated radius. The circles could not overlap.

Measuring accurately with a ruler and using a compass correctly were two skills required in this item. Careless substitution into the formula caused some incorrect calculations.

Students should remember to check the reasonableness of their answers, e.g. in this item the measured length of the chord was sometimes given not as 95 mm but as 950 mm, which is clearly too large. When an item comprises two parts it is expected that values determined in the first part are to be used towards the solution to the second part. Using the already obtained value/s will save time.

Model response

- I. Carefully measure (in mm), the length of the chord and the vertical height of the top segment on the diagram. A formula that can be used to find the area of a segment is:

$$A = \frac{2}{3}hc + \frac{h^3}{2c} \quad \text{where } h = \text{vertical height of the segment}$$

$c = \text{length of the chord}$

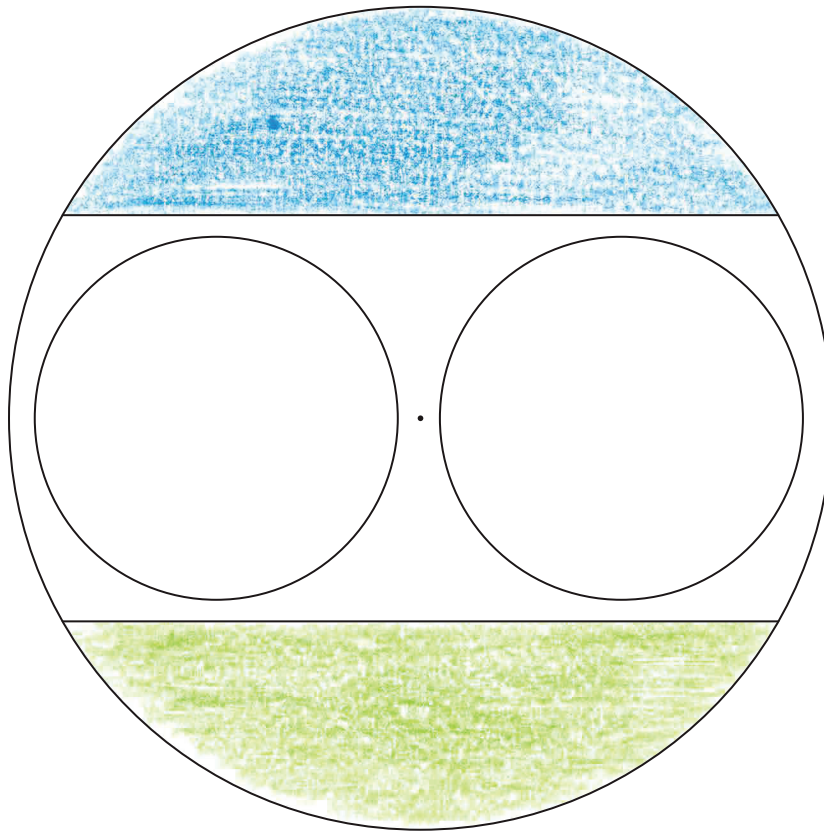
Use this formula to find the area of the top segment.

Show all steps. In the diagram $h = 28$ mm and $c = 94$ mm.

Give answer to the nearest square millimetre.

$$\begin{aligned} A &= \frac{2}{3}hc + \frac{h^3}{2c} \\ &= \frac{2}{3} \times 28 \times 94 + \frac{28^3}{2 \times 94} \\ &= 1754.67 + 116.77 \\ &= 1871.44 \text{ mm} \\ &= 1871 \text{ mm} \end{aligned}$$

To complete the diagram, two circles will be positioned in the space between the top and bottom segments. Each of the circles will have the same area as each of the segments.



II. Find the required radius then draw the two circles on the diagram above. Use a drawing compass.

Show working $A = \pi r^2$
to calculate
the radius. $1871 = \pi r^2$
.....
..... $r^2 = 595.56$
.....
..... $r = \sqrt{595.56}$
.....
..... $r = 24.4 \text{ mm}$
.....
.....

UNIT SIX

ITEM 10

Marking Scheme

PERFORMANCE DOMAIN	57 Manipulating/operating/using equipment	19 Substituting in formulae
	37 Applying a progression of steps to achieve the required answer	43 Analysing

A	<p>The response shows valid steps and provides</p> <ul style="list-style-type: none"> the required measurement of h and c correct substitution of h and c into the formula correct segment area to the nearest square millimetre recognition that segment area equals circle area correct radius for the circles. <p>The two circles are accurately constructed within the designated area using the stated radius.</p> <p>The circles do not overlap.</p> <p>No incorrect information or working has been used.</p>	B	<p>The response shows valid steps and allowing for at most one observable error with consequently correct working as applicable, provides</p> <ul style="list-style-type: none"> reasonable measurement of h and c substitution of h and c into formula calculation of segment area recognition that segment area equals circle area a radius for the circles. <p>Two circles are accurately constructed within the designated area using the stated radius.</p> <p>The circles do not overlap.</p> <p style="text-align: center;">OR</p> <p>The response shows valid steps and provides</p> <ul style="list-style-type: none"> the required measurement of h and c correct substitution of h and c into the formula correct segment area to the nearest square millimetre recognition that segment area equals circle area correct radius for the circles. <p>The two circles are drawn sufficiently well and within the designated area using the stated radius.</p> <p>The circles do not overlap.</p> <p>No incorrect information or working has been used.</p>	C	<p>The response, allowing for at most one observable error with consequently correct working as applicable, provides</p> <ul style="list-style-type: none"> reasonable measurement of h and c substitution of h and c into formula calculation of segment area recognition that segment area equals circle area a radius for the circles. <p>One circle is drawn sufficiently well within the designated area using the stated radius.</p> <p style="text-align: center;">OR</p> <p>The response shows valid steps and provides</p> <ul style="list-style-type: none"> the required measurement of h and c correct substitution of h and c into the formula correct segment area to the nearest square millimetre recognition that segment area equals circle area correct radius for the circles. 	D	<p>The response provides</p> <ul style="list-style-type: none"> reasonable measurement of h or c substitution of h and c into formula consequently correct calculation of segment area. <p style="text-align: center;">OR</p> <p>The response provides</p> <ul style="list-style-type: none"> recognition that a stated segment area equals circle area allowing for at most one observable error and consequently correct working as applicable, a radius for the circles. <p style="text-align: center;">OR</p> <p>The response provides two circles drawn sufficiently well and within the designated area using a stated radius.</p> <p>The circles do not overlap.</p>	E	<p>The response provides</p> <ul style="list-style-type: none"> reasonable measurement of h or c substitution of h and c into formula. <p style="text-align: center;">OR</p> <p>The response provides one circle drawn sufficiently well and within the designated area using a stated radius.</p>	N	<p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
		O	<p>No response has been made at any time.</p>								

UNIT SIX

ITEM 10

Marking Scheme

Notes:

- The required measurement of h is between 26 mm and 28 mm and c is between 93 mm and 95 mm inclusive or the equivalent, e.g. 9.5 cm.
- Accurate construction requires a circle to:
 - appear to be drawn using a drawing compass
 - be complete with a constant radius
 - lie within 1 mm of the stated radius (for an A-grade response, this is within the pink area of the template).
- The designated area is the white space inside the window between the segments.
- An ‘observable error’ means that sufficient intermediate steps are shown so that an inference does not need to be made about how an incorrect result was obtained. Such errors include:
 - a misuse of units
 - a conversion error
 - a recognisable transcription error
 - an incorrect result to a correctly stated operation
 - inappropriate rounding
 - h and c swapped in the formula.
- Reasonable measurement of h is between 25 mm and 29 mm and c is between 92 mm and 96 mm inclusive or the equivalent, e.g. 2.5 cm
- ‘Drawn sufficiently well’ requires a circle to mostly lie within 3 mm of the stated radius.
- Marking aid:

		h and (r)																	
		25	(r)	25.5	(r)	26	(r)	26.5	(r)	27	(r)	27.5	(r)	28	(r)	28.5	(r)	29	(r)
92	1618	22.7	1654	22.9	1690	23.2	1726	23.4	1763	23.7	1800	23.9	1837	24.2	1874	24.4	1911	24.7	
92.5	1626	22.8	1662	23.0	1698	23.3	1735	23.5	1771	23.7	1808	24.0	1845	24.2	1883	24.5	1920	24.7	
93	1634	22.8	1670	23.1	1706	23.3	1743	23.6	1780	23.8	1817	24.0	1854	24.3	1891	24.5	1929	24.8	
93.5	1642	22.9	1678	23.1	1715	23.4	1751	23.6	1788	23.9	1825	24.1	1863	24.4	1900	24.6	1938	24.8	
c	94	1650	22.9	1686	23.2	1723	23.4	1760	23.7	1797	23.9	1834	24.2	1871	24.4	1909	24.7	1947	24.9
	94.5	1658	23.0	1694	23.2	1731	23.5	1768	23.7	1805	24.0	1843	24.2	1880	24.5	1918	24.7	1956	25.0
	95	1666	23.0	1702	23.3	1739	23.5	1776	23.8	1814	24.0	1851	24.3	1889	24.5	1927	24.8	1965	25.0
	95.5	1673	23.1	1710	23.3	1747	23.6	1785	23.8	1822	24.1	1860	24.3	1898	24.6	1936	24.8	1974	25.1
	96	1681	23.1	1718	23.4	1756	23.6	1793	23.9	1831	24.1	1868	24.4	1906	24.6	1945	24.9	1983	25.1

UNIT SIX

ITEM 10

Model Response:

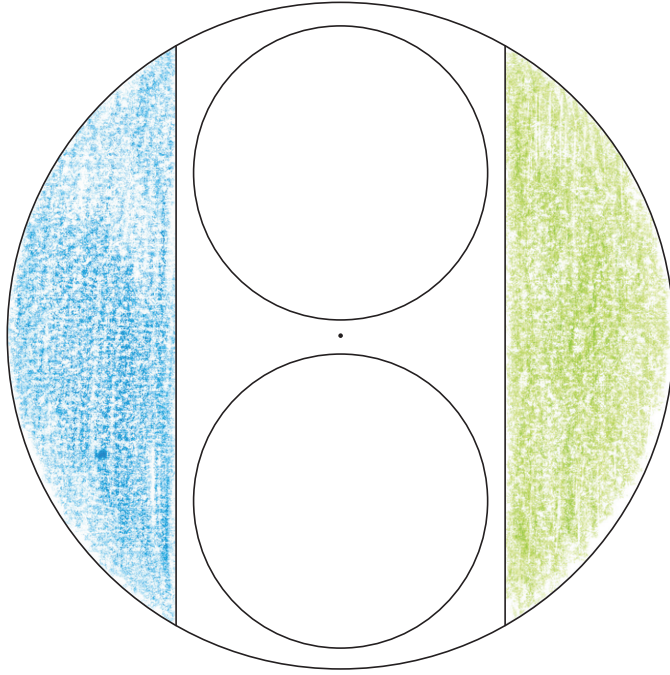
- I. In the diagram $h = 28$ mm and $c = 94$ mm.

$$\begin{aligned} A &= \frac{2}{3}hc + \frac{h^3}{2c} \\ &= \frac{2}{3} \times 28 \times 94 + \frac{28^3}{2 \times 94} \\ &= 1754.67 + 116.77 \\ &= 1871.44 \text{ mm} \\ &= 1871 \text{ mm} \end{aligned}$$

Marking Scheme

II.

$$\begin{aligned} A &= \pi r^2 \\ 1871 &= \pi r^2 \\ r^2 &= 595.56 \\ r &= \sqrt{595.56} \\ r &= 24.4 \text{ mm} \end{aligned}$$



Unit Seven

The items in this unit are based on advertisements used in anti-smoking campaigns.

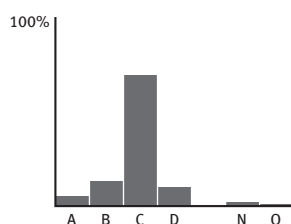
The following table shows the percentage of responses awarded the various grades for the items in this unit.

	A	B	C	D	E	N	O
Item 11	5.3	13.2	69	9.9		1.8	0.7
Item 12	1.8	8.4	26.5	21.6	23.9	16.1	1.8

A shaded box indicates that the grade was not available for that item.

Item 11

Commentary



Item 11 is a three-star item that tested achievement in CCEs 5 *Interpreting the meaning of... illustrations*, 43 *Analysing* and 26 *Explaining to others*.

This item required students to study the given advertisement and clearly explain the message being communicated, the techniques used to get the message across and the emotions/feelings being targeted.

An A-grade response needed to provide the full message, describe and explain how the digitally altered arm was used to support the message and indicate how the text of the illustration supported the message. Responses also needed to identify two emotions/feelings targeted by the advertisement and explain one of them. No inconsistencies or contradictions could occur across the response.

Some responses only partly attended to the task, e.g. described the digitally altered arm and the text but either did not explain how these features supported the message or identified only one emotion. To gain the highest grade, all requirements must be met correctly. Some responses incorrectly described an emotion/feeling felt by the child rather than the viewer of the advertisement.

Students should remember to read the task carefully and to analyse visual and textual elements rather than simply provide a list of what can be seen.

Model response

The advertisement on the opposite page is trying to convince certain smokers to stop smoking.

Study this advertisement and clearly explain:

- (a) what message is being communicated
- (b) the techniques used to get the message across
- (c) the emotions/feelings being targeted.

(a) *The message is about how adults who smoke at home damage the health of children due to second-hand smoke. The Roy Castle Lung Cancer Foundation wants adults to stop smoking at home.*

(b) *Photo-shopping an adult's arm holding a cigarette onto a boy's body implies he is forced to breathe in the second-hand smoke from a parent's cigarette and is equivalent to him smoking. The shocking facts about the harm second-hand smoke causes in the UK, with 17 000 UK children being hospitalised in a year, supports the image.*

(c) *The image of the sad young child aims to evoke the feelings of guilt or remorse and sadness in parents who smoke near their children.*

UNIT SEVEN ITEM 11

Marking Scheme

PERFORMANCE DOMAIN	5 Interpreting the meaning of ... illustrations	43 Analysing
	26 Explaining to others	

A	B	C	D	N
<p>The response</p> <ul style="list-style-type: none"> clearly provides the full message describes and explains how the digitally-altered arm is used to support the message indicates how the text supports the message. <p>Two emotions/feelings targeted by the advertisement are identified, one of which is explained.</p> <p>No inconsistencies/contradictions occur across the response.</p>	<p>The response</p> <ul style="list-style-type: none"> provides the message describes and explains how the digitally-altered arm is used to support the message <p>and indicates how this message is supported by the use of one of the following</p> <ul style="list-style-type: none"> the text the logo. <p>One emotion/feeling targeted by the advertisement is identified and explained.</p> <p>No inconsistencies/contradictions occur across the response.</p>	<p>The response</p> <ul style="list-style-type: none"> includes a message that is based on a reasonable reading of the advertisement and indicates how this message is supported by the use of one of the following a visual element the text the logo. <p>One emotion/feeling targeted by the advertisement is identified.</p> <p>OR</p> <p>The response</p> <ul style="list-style-type: none"> clearly provides the full message describes and explains how the digitally-altered arm is used to support the message indicates how the text supports the message. 	<p>The response</p> <ul style="list-style-type: none"> includes a message that is based on a reasonable reading of the advertisement and indicates how this message is supported by the use of one of the following a visual element the text the logo. <p>OR</p> <p>The response identifies</p> <ul style="list-style-type: none"> a message that is based on a reasonable reading of the advertisement one emotion/feeling targeted by the advertisement. 	<p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
				O
				No response has been made at any time.

Notes:

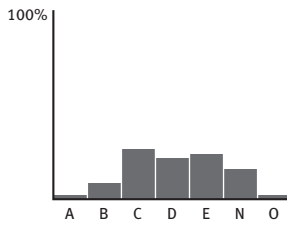
- All parts of the response can work together. Therefore, markers need to consider the whole response and not base grading on particular sections of the response.
- A 'full message' must refer to a parent (adult), child (children), proximity and harm.
- A response that satisfies the requirements of a 'full message' also meets the requirements of both 'the message' and 'a message that is based on a reasonable reading of the advertisement'. Similarly, a response that satisfies the requirements of 'the message' also meets the requirements of 'a message that is based on a reasonable reading of the advertisement'.
- An emotion/feeling must be from the perspective of the reader/viewer and be consistent with/reflect how the target audience is meant to react to it.

Model Response:

- (a) The message is about how adults who smoke at home damage the health of children due to second-hand smoke. The Roy Castle Lung Cancer Foundation wants adults to stop smoking at home.
- (b) Photo-shopping an adult's arm holding a cigarette onto a boy's body implies he is forced to breathe in the second-hand smoke from a parent's cigarette and is equivalent to him smoking. The shocking facts about the harm second-hand smoke causes in the UK, with 17000 UK children being hospitalised in a year, supports the image.
- (c) The image of the sad young child aims to evoke the feelings of guilt or remorse and sadness in parents who smoke near their children.

Item 12

Commentary



Item 12 is a four-star item that tested achievement in CCEs 48 *Justifying*, 27 *Expounding a viewpoint*, 4 *Interpreting the meaning of words* and 31 *Interrelating*.

This item required students to give three significant reasons why a roadside billboard would be an effective medium for the given advertisement.

The cue instructed students to explain their reasons clearly.

An A-grade response needed to provide three different reasons based on features specific to a billboard displaying the advertisement. It also needed to make detailed statements that supported the use of a billboard as an effective medium for this advertisement. No unreasonable assumptions could be used.

Some responses only provided reasons for a roadside billboard being an effective advertising medium and did not link them with the specific anti-smoking advertisement that was provided. The stem specified ‘this’ advertisement.

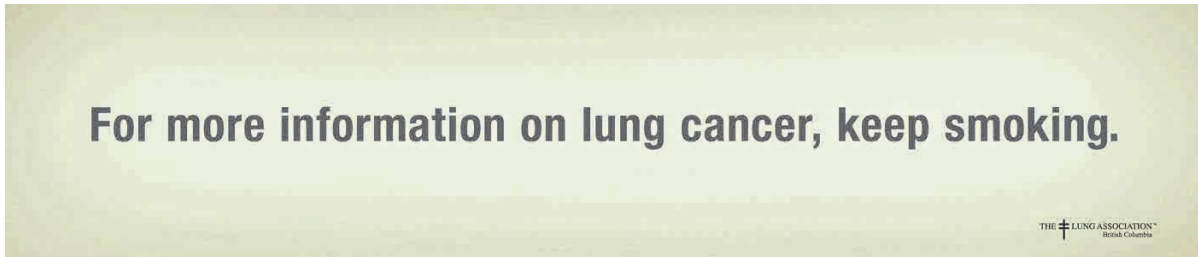
Students should remember to read the stem and any cues carefully so that all aspects of the question are addressed.

Model response

The specific market for the advertisement below is long-term smokers. It has been proposed that roadside billboards be used as its medium.

Give three significant reasons why a roadside billboard would be an effective medium for this advertisement.

Advertisement: market — long-term smokers



Explain your reasons clearly. *This anti-smoking message would be an effective medium on a billboard as long-term smokers are probably also drivers so may have a regular pattern of smoking while driving to work and means they would see this billboard regularly.*

The message is effective because of its double meaning presented in a clever way. The 'keep smoking' really means 'stop smoking' or you will develop lung cancer making this message the opposite of what you would expect so the motorist thinks about their smoking habit as they continue to drive. As a billboard is in a public place for all to see, it is not easy for smokers driving past to avoid reading the unpleasant message about smoking this particular billboard presents. This way the message would more likely stick in the mind of the long-term smoker.

UNIT SEVEN

ITEM 12

Marking Scheme

PERFORMANCE DOMAIN	48	Justifying	27	Expounding a viewpoint
	4	Interpreting the meaning of words ...	31	Interrelating

A	<p>The response gives THREE different reasons.</p> <p>The THREE reasons</p> <ul style="list-style-type: none"> are based on features specific to a roadside billboard displaying this advertisement consist of detailed statements that support a billboard being an effective medium for this advertisement. <p>No unreasonable assumptions are used.</p>	B	<p>The response gives THREE different reasons.</p> <p>TWO of the reasons</p> <ul style="list-style-type: none"> are based on features specific to a roadside billboard displaying this advertisement consist of detailed statements that support a billboard being an effective medium for this advertisement. <p>The other reason</p> <ul style="list-style-type: none"> is based on features specific to a roadside billboard displaying an advertisement consists of statements that support a billboard being an effective medium for an advertisement. <p>No unreasonable assumptions are used.</p>	C	<p>The response gives TWO different reasons.</p> <p>ONE of the reasons</p> <ul style="list-style-type: none"> is based on features specific to a roadside billboard displaying this advertisement consists of detailed statements that support a billboard being an effective medium for this advertisement. <p>The other reason</p> <ul style="list-style-type: none"> is based on features specific to a roadside billboard displaying an advertisement consists of statements that support a billboard being an effective medium for an advertisement. 	D	<p>The response gives ONE reason.</p> <p>This reason</p> <ul style="list-style-type: none"> is based on features specific to a roadside billboard displaying this advertisement consists of detailed statements that support a billboard being an effective medium for this advertisement. <p style="text-align: center;">— OR —</p> <p>The response gives THREE different reasons.</p> <p>The THREE reasons</p> <ul style="list-style-type: none"> are based on features specific to a roadside billboard displaying an advertisement consist of statements that support a billboard being an effective medium for an advertisement. 	E	<p>The response gives TWO different reasons.</p> <p>The TWO reasons</p> <ul style="list-style-type: none"> are based on features specific to a roadside billboard displaying an advertisement consist of statements that support a billboard being an effective medium for an advertisement. 	N	Response is unintelligible or does not satisfy the requirements for any other grade.
					O	No response has been made at any time.					

Model Response:

This anti-smoking message would be an effective medium on a billboard as long-term smokers are probably also drivers so may have a regular pattern of smoking while driving to work and means they would see this billboard regularly. The message is effective because of its double meaning presented in a clever way. The 'keep smoking' really means 'stop smoking' or you will develop lung cancer making this message the opposite of what you would expect so the motorist thinks about their smoking habit as they continue to drive. As a billboard is in a public place for all to see, it is not easy for smokers driving past to avoid reading the unpleasant message about smoking this particular billboard presents. This way the message would more likely stick in the mind of the long-term smoker.

Note:

- Unless stated otherwise, assume that any reference to an advertisement while driving (as driver or passenger) means it has been seen on a roadside billboard.

Unit Eight

The items in this unit are based on setting up a sprinkler system according to a given plan and using a table of information to choose pipes.

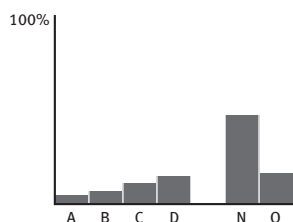
The following table shows the percentage of responses awarded the various grades for the items in this unit.

	A	B	C	D	E	N	O
Item 13	4.7	6.7	11.2	14.2		46.7	16.4
Item 14	9.7	11.6	8.2	25.2	2.2	18.9	24.2

A shaded box indicates that the grade was not available for that item.

Item 13

Commentary



Item 13 is a three-star item that tested achievement in CCEs 37 *Applying a progression of steps to achieve the required answer* and 44 *Synthesising*.

This item presented students with a scale plan showing the layout for a sprinkler system using six sprinklers. The output of each sprinkler was given as 3.6 gallons per minute and the distance between the sprinklers as 30 feet. From the distance information it could be determined that the grid squares were 10 feet by 10 feet.

It was explained that a gallon of water would be enough to cover a 1 foot by 1 foot area to a depth of 0.134 feet (i.e. 1 gallon of water for 0.134 cubic feet). Students were required to calculate how long the water supply would need to be left on so that the shaded area was watered to a depth of 0.080 feet.

The cue directed students to show all steps.

An A-grade response needed to show a method that used all necessary data pieces to determine the number of gallons required to cover the shaded area and then the time it would take for the six sprinklers to deliver this amount of water.

Students should remember to break a complex problem into the smaller parts that build on each other to provide the final answer. This item required that all six pieces of information were used correctly and synthesised into an answer. In some responses one or two of the data-pieces were not considered, which resulted in incorrect answers. Problems in which several parts need to be combined to give the final answer are more easily handled correctly if consistent communication is maintained, e.g. using full and correct units when working with values. The best responses were careful to specify the units, gallons per minute, cubic feet per second, etc. throughout and annotate each line of calculation. This practice also allows for easier checking to ensure the correct progression of steps has been fully completed.

Model response

Determine how long the water supply will need to be left on so that the water from the six sprinklers in the system shown will spread evenly across the darker shaded area to an average depth of 0.080 feet.

Show all steps. *Area of lawn = 3900 square feet.*

.....
Volume of water to be used = 3900 × 0.08 = 312 cubic feet.

.....
One gallon = 0.134 cubic feet.

.....
Gallons required = 312 ÷ 0.134 = 2328.358 gal.

.....
Taps supply = 6 × 3.6 = 21.6 gpm.

.....
Time for tap to be turned on = 2328.358 ÷ 21.6 ≈ 107.8 min.

.....

UNIT EIGHT

ITEM 13

Marking Scheme

PERFORMANCE DOMAIN	37 Applying a progression of steps to achieve the required answer	44 Synthesising
A	<p>The response provides</p> <ul style="list-style-type: none"> a method that correctly uses all the data pieces correct time given in appropriate units reasoning for the progression of steps. <p>No incorrect information or working is used to obtain the answer.</p>	D
B	<p>The response, allowing for at most one observable mechanical error and consequentially correct working as applicable, provides</p> <ul style="list-style-type: none"> a method that correctly uses FIVE data pieces a time. 	C
C	<p>The response shows</p> <ul style="list-style-type: none"> FOUR of the data pieces used meaningfully indications of what is being calculated by the credited data pieces. 	D
D	<p>The response shows</p> <ul style="list-style-type: none"> THREE of the data pieces used meaningfully indications of what is being calculated by the credited data pieces. 	N
E	<p>No response has been made at any time.</p>	O

Notes:

- The data pieces are:
 - area of 1 square = 100 sq ft
 - number of squares = 39
 - sprinkler flow rate = 3.6 gpm
 - number of sprinklers = 6
 - height on 1 sq ft for 1 gallon = 0.134 ft
 - height required on shaded area = 0.08 ft.
- An observable mechanical error is a transcription error or an incorrect result to a correctly stated operation.
- To ascertain whether one of the data pieces has been used meaningfully, check for evidence towards the solution.

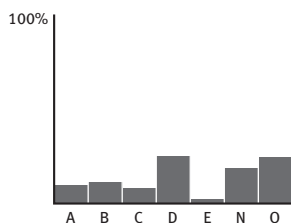
4. $Time = \frac{39 \times 100}{6} \times \frac{0.080}{3.6} \times 0.134$

Model Responses:

- Area of lawn = 3900 square feet.
 Volume of water to be used = $3900 \times 0.08 = 312$ cubic feet.
 One gallon = 0.134 cubic feet.
 Gallons required = $312 \div 0.134 = 2328.358$ gal.
 Taps supply = $6 \times 3.6 = 21.6$ gpm.
 Time for tap to be turned on = $2328.358 \div 21.6 \approx 107.8$ min.
- 1 gallon = $0.134 \text{ ft} \times 1 \text{ ft} \times 1 \text{ ft} = 0.134 \text{ ft}^3$.
 One sprinkler's output = $3.6 \text{ gpm} \times 0.134 \text{ ft}^3 = 0.4824 \text{ ft}^3$ per min.
 Each square foot needs 0.08 ft.
 One sprinkler will take $0.08 \div 0.4824 = 0.1658$ minutes to water one square foot.
 Area to be watered = $39 \times 100 \text{ ft}^2 = 3900 \text{ ft}^2$.
 Time taken by one sprinkler would be $3900 \text{ ft}^2 \times 0.1658 \text{ min per ft}^2 = 646.62$ min.
 Six sprinklers = $646.62 \text{ min} \div 6 = 107.77$ min ≈ 1 hour 48 min to water the shaded area.
- The number of darker shaded squares = $(2 \times 8) + (1 \times 7) + (1 \times 6) + (2 \times 5) = 16 + 7 + 6 + 10 = 39$ squares.
 Each square is 10 feet by 10 feet = 100 sq ft. So darker squares have an area of 3900 sq ft.
 Therefore each sprinkler must water $3900 \div 6 = 650$ sq ft.
 One gallon waters one sq ft to a depth of 0.134 ft but only 0.080 ft is required.
 So only $0.080 \div 0.134 \approx 0.597$ gallons are needed to water each sq ft satisfactorily.
 As each sprinkler delivers 3.6 gallons per minute, this is enough to water $3.6 \div 0.597 \approx 6.03$ sq ft per minute.
 So the time taken to water $650 \text{ sq ft} = 650 \div 6.03 \approx 107.79$ minutes or 107 min 48 sec.

Item 14

Commentary



Item 14 is a four-star item that tested achievement in CCEs 35 *Extrapolating*, 17 *Estimating numerical magnitude*, 22 *Structuring a mathematical argument* and 2 *Finding material in an indexed collection*.

This item comprised two parts. In the first part students were required to complete the table with the pipe size that was suitable for each of the given water-flow rates and in the second part they had to decide whether the 2- or the 2½-inch pipe is the more suitable pipe size for the water-flow rate of 38 gpm.

The cue instructed students to give details pertinent to their decision.

An A-grade response needed to provide the list of the five correct pipe sizes based on the water-flow rate data given in the table. In the second part, evidence of correctly extrapolating the values in the 2- and 2½-inch pipe size columns had to be provided. The response needed to provide a decision as to which pipe size to use based upon the 5 fps rule (for safety and efficiency) described in the stimulus material. This decision needed to be explicitly stated and correctly explained.

Students should interrogate a table fully before attempting to use data from it. In this particular table in the water-flow rate column the increments changed from 1 to 2 gpm after the 12 gpm row. Some responses showed that this change was not recognised and thus caused the extrapolations to be incorrect.

Model response

I. The required water-flow rates in sections of a sprinkler system are given below.

Use Table 1 to find the minimum pipe size needed for each of the required water-flow rates. Consider safety and efficiency. Complete the pipe-size row.

water-flow rate (gpm)	21.6	18.0	14.4	10.8	7.2	3.6
pipe size (inches)	1½	1¼	1¼	1	1	¾

II. Table 1 can be extended for use when the required water-flow rates are greater than the 22 gpm the table shows.

Decide whether the minimum pipe size to suit a water-flow rate of 38 gpm is 2½ inch or 2 inch. Clearly explain and justify your decision.

Give details pertinent to your decision. *for 2-inch pipe: from table an increase of 2 gpm increases the velocity value by approximately 0.22*

22	24	26	28	30	32	34	36	38
2.38	2.60	2.82	3.04	3.26	3.48	3.70	3.92	4.14

for 2½-inch pipe: increase of 2 gpm increases the velocity value by approximately 0.15

22	24	26	28	30	32	34	36	38
1.66	1.81	1.96	2.11	2.26	2.41	2.56	2.71	2.86

safety rule: can't exceed 5 fps which neither size pipe does

efficiency rule: velocity should be as close as possible to 5 fps

The 2-inch pipe with 4.14 fps is the best as 4.14 fps is closer to 5 fps than 2.86 fps.

UNIT EIGHT

ITEM 14

Marking Scheme

PERFORMANCE DOMAIN	35	Extrapolating	17	Estimating numerical magnitude
	22	Structuring ... a mathematical argument	2	Finding material in an indexed collection

A	B	C	D	E	N
<p>The response for part I provides</p> <ul style="list-style-type: none"> the FIVE correct pipe sizes correctly listed <p>for part II provides</p> <ul style="list-style-type: none"> evidence of correctly extrapolating the necessary value/s. <p>The decision to use the 2-inch pipe rather than the 2½-inch pipe is explicitly stated and correctly explained.</p> <p>No incorrect information or statements are used to obtain the answer.</p>	<p>The response for part I provides</p> <ul style="list-style-type: none"> FOUR of the correct pipe sizes correctly listed <p>for part II, allowing for at most one observable mechanical error and consequentially correct working as applicable, provides</p> <ul style="list-style-type: none"> evidence of extrapolating the necessary value/s. <p>A decision to use a consequentially correct pipe size is explicitly stated.</p>	<p>The response for part I provides</p> <ul style="list-style-type: none"> FOUR of the correct pipe sizes correctly listed <p>for part II, provides</p> <ul style="list-style-type: none"> evidence of extrapolating in an attempt to obtain a necessary value. <p>OR</p> <p>The response for part II, allowing for at most one observable mechanical error and consequentially correct working as applicable, provides</p> <ul style="list-style-type: none"> evidence of extrapolating the necessary value/s. <p>A decision to use a consequentially correct pipe size is explicitly stated.</p>	<p>The response for part I provides</p> <ul style="list-style-type: none"> FOUR of the correct pipe sizes correctly listed. <p>OR</p> <p>The response for part II, provides</p> <ul style="list-style-type: none"> evidence of extrapolating in an attempt to obtain a necessary value. <p>A decision to use a consequentially correct pipe size is explicitly stated.</p>	<p>The response for part I provides</p> <ul style="list-style-type: none"> THREE of the correct pipe sizes correctly listed. <p>OR</p> <p>The response for part II, provides</p> <ul style="list-style-type: none"> evidence of extrapolating in an attempt to obtain a necessary value. 	<p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
					<p>O</p> <p>No response has been made at any time.</p>

Notes:

- The five correct pipe sizes are $1\frac{1}{2}$ | $1\frac{1}{4}$ | $1\frac{1}{4}$ | 1 | $\frac{3}{4}$
- The decision to use the 2-inch pipe or the decision to use a consequentially correct pipe size and the correct explanation must be based on extrapolated data and 5 fps rules.
- An observable mechanical error is a transcription error, an incorrect result to a correctly stated operation or using the 2 gpm increment from the table as a 1 gpm increment.
- A necessary value is the velocity of water in the pipe at 38 gpm.

UNIT EIGHT ITEM 14

Marking Scheme

Model Responses:

1.
I.

water-flow rate (gpm)	21.6	18.0	14.4	10.8	7.2	3.6
pipe size (inches)	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{4}$	1	1	$\frac{3}{4}$

II.
The water-flow rate of a 2-inch pipe increases by 0.11 every 1 gpm.

The water-flow rate of a 2½-inch pipe increases by 0.07 then 0.08 and this repeats continuously.
Water-flow rate increase averages 0.075 fps every 1 gpm.

2-inch pipe

$0.10 + 0.11 \times 37 = 4.17$, therefore velocity if using 2-inch pipe would be 4.17 fps.

2½-inch pipe

$0.15 + 0.075 \times 36 = 2.85$, therefore velocity if using 2½-inch pipe would be 2.85 fps.

Therefore the 2-inch pipe is the minimum size to suit a water-flow rate of 38 gpm as the velocity is below 5 fps, but as close to 5 fps as possible out of the two pipes.

2.
I.

water-flow rate (gpm)	21.6	18.0	14.4	10.8	7.2	3.6
pipe size (inches)	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{4}$	1	1	$\frac{3}{4}$

II.
for 2-inch pipe: from table an increase of 2 gpm increases the velocity value by approximately 0.22

22	24	26	28	30	32	34	36	38
2.38	2.60	2.82	3.04	3.26	3.48	3.70	3.92	4.14

for 2½-inch pipe: increase of 2 gpm increases the velocity value by approximately 0.15

22	24	26	28	30	32	34	36	38
1.66	1.81	1.96	2.11	2.26	2.41	2.56	2.71	2.86

safety rule: can't exceed 5 fps which neither size pipe does

efficiency rule: velocity should be as close as possible to 5 fps

The 2-inch pipe with 4.14 fps is the best as 4.14 fps is closer to 5 fps than 2.86 fps.

Unit Nine

The items in this unit are based on a short play about a cheating incident at a school.

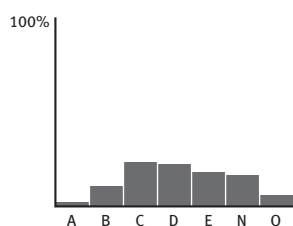
The following table shows the percentage of responses awarded the various grades for the items in this unit.

	A	B	C	D	E	N	O
Item 15	2.2	10.9	23.6	22.2	18.4	16.7	6.0
item 16	3.2	4.8	33.4	29.9	9.6	6.3	12.8

A shaded box indicates that the grade was not available for that item.

Item 15

Commentary



Item 15 is a four-star item that tested achievement in CCEs 33 *Inferring*, 52 *Searching and locating ... information* and 12 *Compiling lists*.

This item required students to list the events that happened in order: starting at the night before the test when student A watches TV for five hours and ending with the morning after the test when A and H arrive outside Mr Hill's office and are about to have their conversation.

The cue directed students to use point form and to indicate when each event happened.

An A-grade response needed to provide the seven essential events in the correct sequence and could include additional acceptable events. Any acceptable events included also had to be correctly positioned within the sequence. The response needed to provide evidence of an understanding about when each of the essential events happened. No errors or incorrect statements could appear in an A-grade response.

Students should remember to consider all relevant information provided before they begin to craft their response. The stem indicated that the introductory information as well as the dialogue should be considered when listing the events that occurred. The event mentioned in the introduction, i.e. 'they had both been called to the office the previous day to explain their conduct' was often omitted from the list of events in responses.

Students should be precise in their use of language to convey their ideas accurately. Some responses incorrectly listed A's mum being called to the office rather than already being in the office as indicated in the script.

Model response

Enough evidence is given in the introductory information and in the dialogue to be able to infer the sequence of events leading up to A and H arriving outside Mr Hill's office.

List, in order, the events that happened. Start at the night before the test when student A watches TV for five hours. End with the morning after the test when A and H arrive outside Mr Hill's office and are about to have their conversation.

Use point form. Indicate when each event happened.

The first event and an indication of when it happened has been given.

- student A watches TV for five hours (night before the test)
- *A and H study together before test on day of test*
- *In the test A copies from H*
- *A and H are called to the principal's office later that day*
- *That night H tells mother*
- *H's mother contacts principal the next morning*
- *A's mother in the office that morning*
- *In the morning A and H arrive outside office*

UNIT NINE

ITEM 15

Marking Scheme

PERFORMANCE DOMAIN

33 Inferring

52 Searching and locating ... information

12 Compiling lists ...

<p>A</p> <p>The response</p> <ul style="list-style-type: none"> provides <u>the SEVEN</u> essential events in <u>the</u> correct sequence and may include acceptable events. <p>Acceptable events that are included must be correctly positioned within <u>the</u> sequence.</p> <p>There is an understanding of when the essential events happened. No errors or incorrect statements appear in the response.</p>	<p>B</p> <p>The response, allowing for at most two errors (each of a different type)</p> <ul style="list-style-type: none"> provides essential events in sequence and may include acceptable events positioned within the sequence. 	<p>C</p> <p>The response provides FIVE of the essential events, in correct sequence.</p>	<p>D</p> <p>The response provides FOUR of the essential events, in correct sequence.</p>	<p>E</p> <p>The response provides THREE of the essential events, in correct sequence.</p>	<p>N</p> <p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
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<p>O</p> <p>No response has been made at any time.</p>

Notes:

1. The seven essential events in the correct sequence are:

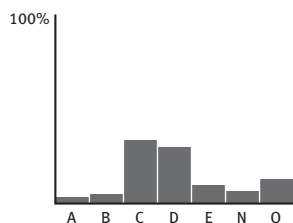
- A&H study together
- A copies off H
- A&H called to office
- H tells mum
- H's mum calls school
- A's mum in office
- A&H arrive outside office

Model Response:

- A and H study together before test on day of test
 - In the test A copies from H
 - A and H are called to the principal's office later that day
 - That night H tells mother
 - H's mother contacts principal the next morning
 - A's mother in the office that morning
 - In the morning A and H arrive outside office
- Acceptable events could reasonably have happened during the stipulated time frame, e.g. Mr Hill is told they have the same answers.
 - Incorrect statements, only considered at the A-grade, refer to events where A is used instead of H or other letters are used or the test is misnamed as maths or social studies test.
At the other grades (B, C, D and E), if throughout the response A is used for H and vice versa or letters other than A or H are used consistently, read the response as if they are being used correctly and grade accordingly.
 - There are three possible types of errors:
 - accuracy error — an event is given but it did not happen or it happened outside the stipulated time-frame
 - omission error — an essential event is missing
 - sequence error — an essential or acceptable event is incorrectly positioned within the sequence.
 - Providing the required number of essential events are given and they are in correct sequence, any number of errors may appear in the response without penalty at the C-, D- and E-grades.

Item 16

Commentary



Item 16 is a four-star item that tested achievement in CCEs 28 *Empathising*, 26 *Explaining to others*, 43 *Analysing* and 55 *Gesturing*.

This item required students to consider two different ways the actor playing H could deliver the final words of the play that would result in two different meanings being conveyed. For each of the different ways of delivering the words, students had to describe how H might use two of an actor's tools: voice, body movements/gestures or facial expressions. For each delivery, students had to

ensure the intended meaning was clearly conveyed. The response area for this item was organised in two sections so students were prompted to consider a first meaning and delivery and a second meaning and delivery.

The cue in each section directed students to be specific in their descriptions.

An A-grade response for each section needed to provide a meaning and give a description of how to use two of the tools of the trade to achieve that meaning. The use of each of the tools had to be explicitly linked to the intended meaning in both of the sections. The meanings had to be different and could not be inconsistent with a reasonable reading of the play. No transcription errors could appear in the response.

Students should remember to read the introduction to an item carefully so they understand definitions and explanations that are provided. In this item an explanation of the tools of an actor's trade was given. In understanding the possible meaning of a play script's final line, the entire script must be understood. A cue must always be attended to. The cue to 'Be specific in your descriptions' was important for success in this item as some responses did not receive the highest grade as the descriptions given were too general.

Model response

The last line of the play has H asking A:

So what are you going to do about today's social studies test?

Consider two different ways the actor playing H could deliver these words that would result in two different meanings being conveyed.

For each of the different ways of delivering the words, describe how the actor could use **two** of the tools — voice, body movement/gestures, facial expressions — when delivering the words to achieve an intended meaning. For each delivery ensure the intended meaning is stated clearly.

FIRST MEANING AND DELIVERY

Be specific in your description. *This line may be read as meaning, 'OK, if you are not going to cheat, how on earth are you going to pass today's test?' I suggest the actor deliver these lines with a long gloating 'So' followed by the rest of the sentence in a mocking/taunting tone, with special stress on the words 'you' and 'today's'. The delivery of the words should be accompanied by an exaggerated, arm-long finger pointing at A. H is to give impression that she'll enjoy seeing A's train wreck.*

SECOND MEANING AND DELIVERY

Be specific in your description. *This line may be read as meaning, 'So, once we've sorted this case of cheating, what's your plan for cheating in today's test?' H should lean in toward A conspiratorially and say the words in an eager whisper. H is to give the impression that the past is forgotten and she and A are again partners in crime.*

Marking Scheme

UNIT NINE ITEM 16

PERFORMANCE DOMAIN 28 Empathising 26 Explaining to others 43 Analysing 55 Gesturing

A	<p>For <u>each</u> section, the response</p> <ul style="list-style-type: none"> • provides a meaning • gives a description of how to use TWO of the tools to achieve that meaning. <p>The use of each of the tools is explicitly linked to the intended meaning in both of the sections.</p> <p>The meanings are different and are not inconsistent with a reasonable reading of the play.</p> <p>No transcription errors appear in the response.</p>	B	<p>For <u>each</u> section, the response</p> <ul style="list-style-type: none"> • provides a meaning • gives a description of how to use ONE of the tools to achieve that meaning. <p>The use of the tool is explicitly linked to the intended meaning in both of the sections.</p> <p>The meanings are different and are not inconsistent with a reasonable reading of the play.</p> <p style="text-align: center;">— OR —</p> <p>For <u>each</u> section, the response</p> <ul style="list-style-type: none"> • provides a meaning • gives a description of how to use TWO of the tools to achieve that meaning. <p>The meanings are different and are not inconsistent with a reasonable reading of the play.</p>	C	<p>For <u>each</u> section, the response</p> <ul style="list-style-type: none"> • provides a meaning. <p>The meanings are different and are not inconsistent with a reasonable reading of the play.</p> <p style="text-align: center;">— OR —</p> <p>For <u>one</u> section, the response</p> <ul style="list-style-type: none"> • provides a meaning • gives a description of how to use ONE of the tools to achieve that meaning. <p>The meaning is not inconsistent with a reasonable reading of the play.</p>	D	<p>For <u>each</u> section, the response</p> <ul style="list-style-type: none"> • provides a meaning. <p>The meaning is not inconsistent with a reasonable reading of the play.</p> <p style="text-align: center;">— OR —</p> <p>For <u>each</u> section, the response</p> <ul style="list-style-type: none"> • indicates H's attitude towards A • gives a description of how to use ONE of the tools to achieve that attitude. <p>The two attitudes are different and are not inconsistent with a reasonable reading of the play.</p>	E	<p>For <u>one</u> section, the response</p> <ul style="list-style-type: none"> • indicates H's attitude towards A • gives a description of how to use ONE of the tools to achieve that attitude. <p>The attitude is not inconsistent with a reasonable reading of the play.</p>	N	<p>Response is unintelligible or does not satisfy the requirements for any other grade.</p>
								O			<p>No response has been made at any time.</p>

Model Response:

FIRST MEANING AND DELIVERY

This line may be read as meaning, 'OK, if you are not going to cheat, how on earth are you going to pass today's test?' I suggest the actor deliver these lines with a long gloating 'So' followed by the rest of the sentence in a mocking/taunting tone, with special stress on the words 'you' and 'today's'. The delivery of the words should be accompanied by an exaggerated, arm-long finger pointing at A. H is to give impression that she'll enjoy seeing A's train wreck.

SECOND MEANING AND DELIVERY

This line may be read as meaning, 'So, once we've sorted this case of cheating, what's your plan for cheating in today's test?' H should lean in toward A conspiratorially and say the words in an eager whisper. H is to give the impression that the past is forgotten and she and A are again partners in crime.

UNIT NINE

ITEM 16

Marking Scheme

Notes:

1. The meaning provides an understanding of what H means when the actor delivers the last line of the play. A has just said, 'I'm never going to cheat again.' Is this true or not?
Ask — what does H mean when she says the line. It is not just about how H feels. How H feels is H's attitude towards A.
2. The three tools to choose two from are voice, body movement/gestures, facial expressions.
A description of how to use a tool shows what it is the actor will do with the tool. The description must be specific so a person would know what to do with their voice or their body or their face, e.g. a loud voice, a shrug, a smile, cross the arms. The description does not just use such phrases as an open stance, a quizzical look, a sarcastic voice.
Until we know what to do with voice or body or face, a description of a tool has not been given.
 - For voice, the use of any of the following might give the tone of voice. The tone is the effect but something must be done with: pitch, volume, emphasis, inflection, speed/pace, pause.
 - For body movement/gestures, a movement must be described, not just an effect. A friendly gesture is an effect which might be achieved by putting an arm around the person.
 - For facial expression, the description must say how to use features of the face, e.g. an angry face is not a description of using facial expressions. It is an effect caused perhaps by glaring at the other person or using a death stare.
3. Transcription errors, only considered at the A-grade, occur when A is used instead of H or other letters are used or other naming mistakes are made.
At the other grades (B, C, D and E) read the response as though the error has not been made and grade accordingly.