

Retrospective

2016 Queensland Core Skills Test

Multiple Choice (MC) I & II (Part 1 of 5)



For all Queensland schools

Multiple Choice (MC) I & II

The 2016 MC subtest consisted of two testpapers, each with 25 verbal and 25 quantitative items. For an item, the facility (F) is the proportion of students who gave the correct response; it is expressed as a percentage. For the 2016 MC subtest, the average facility (AF) was 51.5%. The average facility on verbal items was 50.9%, and on quantitative items was 52.1%. The average facility for MC I was 50.1% and for MC II was 52.9%. Males performed better than females (the average facility for males was 54.1% and for females 49.4%). On MC I, facilities for items ranged from 23% (item 13) to 82% (item 6), and on MC II from 28% (item 94) to 85% (item 52).

Within the verbal domain, stimulus materials included extracts from novels, plays, memoirs, quotations, short stories, cartoons, anecdotes and commentaries. Within the quantitative domain, stimulus materials included formulae, algebraic expressions, diagrams, illustrations, tables, graphs and maps. Epistemic areas covered included English language and literature, literary theory, philosophy, ethics, civics, biology, physics, chemistry, astronomy, physiology, history, geography, architecture, and both pure and applied mathematics.

The following table summarises data about the 24 units that made up the 2016 MC subtest. The main Common Curriculum Elements (CCEs) tested in each unit are listed. The order of the CCEs for each unit does not reflect the order of the items, nor does it imply a cognitive hierarchy. The baskets into which CCEs are grouped are shown in Appendix 3.

MC I & II 2016 summary

Unit	Item	Key	Basket	F	AF (%)	Common Curriculum Elements
1 <i>Life</i> (poem)	1	A	α	54	58	4 <i>interpreting the meaning of words or other symbols</i> 29 <i>comparing, contrasting</i> 45 <i>judging/evaluating</i>
	2	D	θ	63		
	3	D	β	56		
2 <i>Roman calendar</i> (table; arithmetic)	4	B	α	73	76	13 <i>recording/noting data</i> 16 <i>calculating</i> 31 <i>interrelating ideas/themes/issues</i>
	5	C	ϕ	80		
	6	B	ϕ	82		
	7	C	β	71		
3 <i>Gobi desert</i> (prose nonfiction; memoir)	8	D	θ	48	56	33 <i>inferring</i> 43 <i>analysing</i> 45 <i>judging/evaluating</i>
	9	B	θ	66		
	10	A	θ	61		
	11	D	θ	49		
4 <i>Punch cards</i> (illustrations; mathematical rules)	12	A	α	51	46	4 <i>interpreting the meaning of words or other symbols</i> 7 <i>translating from one form to another</i> 16 <i>calculating</i> 36 <i>applying strategies to trial and test ideas</i> 60 <i>sketching/drawing</i>
	13	D	ϕ	23		
	14	C	α	75		
	15	B	α	60		
	16	A	β	36		
	17	C	π	30		
5 <i>Tact</i> (novel)	18	D	α	52	49	4 <i>interpreting the meaning of words or other symbols</i> 11 <i>summarising/condensing written text</i> 28 <i>empathising</i> 33 <i>inferring</i> 43 <i>analysing</i>
	19	B	θ	50		
	20	A	α	68		
	21	D	θ	35		
	22	A	π	42		
6 <i>Moon phases</i> (graph)	23	C	α	48	51	6 <i>interpreting the meaning of tables, diagrams, maps or graphs</i> 7 <i>translating from one form to another</i>
	24	C	α	51		
	25	D	α	42		
	26	C	α	53		
	27	B	α	61		
7 <i>Malls</i> (prose nonfiction; architecture & society)	28	C	π	28	45	4 <i>interpreting the meaning of words or other symbols</i> 11 <i>summarising/condensing written text</i> 38 <i>generalising</i> 43 <i>analysing</i>
	29	A	α	49		
	30	C	θ	63		
	31	B	β	41		
8 <i>Lucas numbers</i> (number sequence)	32	C	θ	60	47	17 <i>estimating numerical magnitude</i> 32 <i>deducing</i> 35 <i>extrapolating</i> 45 <i>judging/evaluating</i> 49 <i>perceiving patterns</i>
	33	B	θ	69		
	34	D	β	44		
	35	A	θ	35		
	36	C	θ	47		
	37	A	ϕ	30		

Unit	Item	Key	Basket	F	AF (%)	Common Curriculum Elements
9 <i>Poststructuralists</i> (prose nonfiction; philosophy)	38	B	θ	61	45	33 <i>inferring</i> 35 <i>extrapolating</i> 43 <i>analysing</i> 45 <i>judging/evaluating</i>
	39	A	θ	48		
	40	A	θ	34		
	41	D	θ	39		
10 <i>Hydrocarbons</i> (chemistry diagrams)	42	B	α	32	35	6 <i>interpreting the meaning of tables, diagrams, maps or graphs</i> 7 <i>translating from one form to another</i> 33 <i>inferring</i>
	43	D	α	30		
	44	A	θ	38		
	45	B	α	40		
11 <i>Libraries</i> (prose nonfiction; civics)	46	D	θ	50	48	4 <i>interpreting the meaning of words or other symbols</i> 29 <i>comparing, contrasting</i> 31 <i>interrelating ideas/themes/issues</i> 33 <i>inferring</i> 43 <i>analysing</i>
	47	C	β	39		
	48	B	α	60		
	49	D	θ	46		
	50	A	β	44		
12 <i>Idealists</i> (cartoon; philosophy)	51	D	α	70	70	5 <i>interpreting the meaning of pictures and illustrations</i>
13 <i>Training zones</i> (formulae)	52	A	ϕ	85	67	16 <i>calculating</i> 19 <i>substituting in formulae</i> 33 <i>inferring</i>
	53	D	ϕ	72		
	54	B	ϕ	57		
	55	A	ϕ	70		
	56	B	ϕ	62		
	57	C	θ	55		
14 <i>Rematch</i> (short story)	58	B	α	46	59	4 <i>interpreting the meaning of words or other symbols</i> 31 <i>interrelating ideas/themes/issues</i> 33 <i>inferring</i> 43 <i>analysing</i>
	59	D	θ	74		
	60	C	θ	64		
	61	A	β	53		
15 <i>Quotations</i>	62	D	θ	42	41	29 <i>comparing, contrasting</i> 43 <i>analysing</i>
	63	A	β	40		
16 <i>Makruk</i> (board game)	64	B	β	49	55	6 <i>interpreting the meaning of tables, diagrams, maps and graphs</i> 36 <i>applying strategies to trial and test ideas</i> 45 <i>judging/evaluating</i>
	65	D	α	82		
	66	B	β	57		
	67	B	α	45		
	68	C	θ	43		
17 <i>Humorous story</i> (prose nonfiction; literature)	69	A	α	68	48	4 <i>interpreting the meaning of words or other symbols</i> 33 <i>inferring</i> 43 <i>analysing</i>
	70	D	θ	30		
	71	A	α	59		
	72	C	θ	56		
	73	A	θ	26		

Unit	Item	Key	Basket	F	AF (%)	Common Curriculum Elements
18 <i>Lakes</i> (table, diagram; geography)	74	D	β	44	45	16 <i>calculating</i> 19 <i>substituting in formulae</i> 29 <i>comparing, contrasting</i> 32 <i>deducing</i> 41 <i>hypothesising</i>
	75	B	ϕ	50		
	76	D	θ	55		
	77	C	ϕ	48		
	78	C	θ	30		
19 <i>Bats</i> (graph; biology)	79	B	α	39	39	6 <i>interpreting the meaning of tables, diagrams, maps or graphs</i>
20 <i>Power</i> (formulae; physics)	80	A	α	57	55	7 <i>translating from one form to another</i> 19 <i>substituting in formulae</i>
	81	C	ϕ	52		
21 <i>History</i> (novel)	82	A	α	50	51	4 <i>interpreting the meaning of words or other symbols</i> 11 <i>summarising/condensing written text</i> 33 <i>inferring</i> 43 <i>analysing</i>
	83	C	θ	44		
	84	B	θ	49		
	85	D	π	60		
22 <i>Tone</i> (diagram, graph; physics)	86	B	θ	68	48	6 <i>interpreting the meaning of tables, diagrams, maps or graphs</i> 15 <i>graphing</i> 16 <i>calculating</i> 32 <i>deducing</i> 37 <i>applying a progression of steps to achieve the required answer</i>
	87	C	ϕ	44		
	88	A	ϕ	41		
	89	D	π	53		
	90	C	α	46		
	91	A	ϕ	37		
23 <i>Sundial</i> (playscript)	92	B	θ	72	51	4 <i>interpreting the meaning of words or other symbols</i> 33 <i>inferring</i> 38 <i>generalising</i>
	93	C	α	59		
	94	B	β	28		
	95	D	β	43		
	96	C	θ	54		
24 <i>Conscience</i> (quotations; ethics)	97	C	θ	70	53	11 <i>summarising/condensing written text</i> 29 <i>comparing, contrasting</i> 30 <i>classifying</i> 43 <i>analysing</i>
	98	A	β	49		
	99	B	π	64		
	100	D	β	30		
Average facility on subtest					51.5	

MC I commentary

This section gives a brief outline of each unit. Two units (5 and 8) are singled out for detailed analysis.

Unit 1 *Life*

The first unit on this testpaper is based on a short poem by Paul Dunbar.

Unit 2 *Roman calendar*

This unit is based on changes to the ancient Roman calendar. The items required finding relevant information in the table and performing calculations.

Unit 3 *Gobi desert*

The short, memoir-style text in this unit recounts the experiences of two fellow travellers in the Gobi Desert.

Unit 4 *Punch cards*

This unit required students to understand the logic underlying punch cards, which were used to enter data into computers. Various pieces of information had to be combined and applied in the items.

Unit 5 *Tact*

This unit was based on an extract from a novel. The text is mostly direct dialogue, as would be found in a play; so the challenge here was to identify subtext. In the extract, a senior detective briefs a junior detective about a case involving an attack on winners in a local raffle.

Item 18: Students were required to interpret the meaning of Finch's words regarding his tactfulness. Finch says that he is 'too bad [at tact] to admit it' (i.e. to admit being tactful), but 'too good [at being tactful] to claim it [tactfulness] in the circumstances'. In this convoluted way, Finch means that he thought himself to be tactful, yet regarded it as tactless to boast of it. Option D is the key. Option A is incorrect because Finch aims to be humble rather than proud regarding his level of tactfulness. Option B fails to notice Finch's admission that he thinks himself tactful in his attempt to use tact with his superior. Option C claims Finch admits to lacking tact and is happy to work without it, whereas Finch admits to being tactful and tries to act tactfully.

Item 19: This item asked why tact might be needed in such an investigation. Option B is the key. Tomkins wants Finch to be tactful so as not to frighten the winners when he informs them of potential danger. Option A is not Tomkins's view (he hadn't yet thought that it might warn the attacker of the investigation), but it is one that Finch introduces. Even though the police wish to discover the identity of the attacker, option C forms no part of Tomkins's reasons for wanting Finch to be tactful. Option D is incorrect because Tomkins does not ask Finch to say that the police will neutralise all danger.

Item 20: Students were required to make a judgment about the sort of officer Finch is. Finch shows himself to be capable, as Tomkins himself almost grudgingly acknowledges in lines 2, 7 and 20; however, Finch is also inclined to interrupt his superior, as in lines 13 and 26. The key is therefore option A. Option B is incorrect because Finch's interruptions reveal his insensitivity, and it undermines his attempts to cooperate with Tomkins. Option C is incorrect despite the fact that Finch addresses his superior as 'Sir'; his interruptions reveal an offhandedness that Tomkins, at least, interprets as impoliteness — there are indications that Tomkins feels Finch oversteps the mark. Option D is incorrect because Finch keeps pushing himself and his views forward, which can hardly be described as 'reserved'; also, though Finch shows himself to be ahead of the curve, and to that extent 'efficient', his haste and arrogance immediately undermine that and render him inefficient in his relationships with colleagues and superiors.

Item 21: In this item, students were required to decide why Tomkins is 'pleased' that Finch understands him. Option A suggests that Tomkins values Finch's help; this is unlikely, since by this stage Tomkins is speaking with Finch through gritted teeth (line 27; students need to understand the import of that visual metaphor); this clearly indicates a measure of frustration. Option B implies that Tomkins is relieved that he is finally

getting through to Finch; again, this too is unlikely — the extract suggests that Tomkins is becoming more rather than less tense. Option C takes the view that Tomkins is making an effort to show his appreciation for Finch's contribution; this is incorrect. Tomkins's efforts are directed toward keeping his cool; he is not expressing his appreciation. Tomkins says what is formally 'polite' rather than openly displaying his displeasure (even if he successfully conveys his displeasure in saying it; though if Finch recognises the irony in his superior's comment, he chooses to ignore it). Option D is the key.

Item 22: This item required students to identify the change, over the course of the extract, in the way that Tomkins responds to Finch. Initially there is evidence that Tomkins sees some merit in Finch's recent conduct. As the conversation progresses, Tomkins is put off balance by Finch's insightful interjections. Finally, Tomkins is trying to control his frustration with the constable's persistent interruptions. The key is therefore option A. Option B is incorrect because the narrator says that Tomkins is at that point trying to appear less official (line 5); next, Tomkins seems more critical of himself than Finch (line 20). In the end, Tomkins does not appear grateful but rather regretful of the fact that he must depend on Finch. Option C is incorrect because it would be going too far to say that the cautious Tomkins is initially 'pleased' with Finch; then, it is not anger that Tomkins experiences but surprise at Finch's pushy efforts to impress him. Lastly, Tomkins is not 'reconciled' with Finch; rather, barriers seem to be forming. Option D is incorrect because Tomkins is not initially hesitant: he tests the waters with his first question to Finch and is satisfied; then, Finch's over-eager attitude casts a question over Tomkins's initial assessment of him. Tomkins seems less than encouraged; finally, Tomkins becomes increasingly frustrated with Finch — though his words are measured, Tomkins is not lukewarm toward Finch; rather, he appears to be becoming heated.

Unit 6 *Moon phases*

This unit is based on a graph showing the phases of the moon and the changing distance of the moon from the Earth, across five months in a particular year. The items in this unit required students to find and apply relevant information from the graph.

Unit 7 *Malls*

This unit is based on an opinion piece by Australian writer David Malouf on the social value of shopping malls.

Unit 8 *Lucas numbers*

This unit is based on the set of whole numbers known as Lucas numbers. The first fourteen Lucas numbers are given in a table. The method for generating the next term in the sequence — by adding together the two previous terms — is explained and exemplified.

Item 32: This item required students to extrapolate the sequence and find the value of the largest term with four digits. The sequence beyond the values given in the table continues ... 1364, 2207, 3571, 5778, 9349, 15127, ... Thus the largest Lucas number below 10000 is 9349, which is between 9000 and 9499. Thus option C is the key. The other options are based on miscalculations. For example, reversing the digits of L_{15} so that it reads 1463 instead of 1364 will result in $L_{19} = 9844$, which is option D. If 1364 is correctly calculated and then 521 is added instead of 843, the largest four-digit number in the sequence is 8383, which is option A. Keeping track of the terms in the sequence is made easier if the extended sequence is written down.

Item 33: Since two odd numbers always sum to an even number and an even number plus an odd number always sums to an odd number, the L_n row of the table exhibits an easily recognised pattern: odd-odd-even-odd-odd-even. This item invited students to choose which one of four generalisations matched the relationship between the numbers in the n row and those in the L_n row. Option B is the key — the n -values that match the even values of L_n are 3, 6, 9, 12, etc. Option A works only for $n = 6$ ($L_n = 18$). Option C works for $n = 2$ and 4 but not for $n = 6$. Option D works for $L_n = 18$ and $n = 6$ but not for $L_2 = 3$ or $L_{10} = 123$, so counter-examples abound.

Item 34: The last digits of Lucas numbers follow a cyclic pattern that is 12-digits long. This item referred to the table and specified the first nine digits of the cycle to show what was meant. But to answer it successfully

it was necessary to find the length of the cycle and then apply it to find first where L_{91} is in the sequence and then what number it will have as its last digit. The 84th Lucas number will end in the same digit as the twelfth. Counting on, we get that the 91st Lucas number should end in the same digit as L_7 . This is 9, so option D is the key. Option B results from taking the remainder of 7 when 84 is divided into 91 instead of the seventh digit on the list. Option C involves miscounting from the start of the list or not counting far enough. Option A would have been chosen by those who miscalculated the length of the cycle or took the list of terminal digits given as the complete list and did not interrogate the table.

Item 35: This item tested whether the notation used in this unit was properly understood, since a careful explanation of the relationship between $(L_n)^2$ and L_{2n} was given in the introduction. A first reading eliminates options C and D, which depend on $8^2 = 64$ being relevant, which is not so in this case. A second reading shows that for an even suffix (here 32), 2 has to be subtracted from rather than added to $(L_n)^2$ to get L_{2n} . This method can be easily confirmed using the values for L_4 and L_8 (for example) listed in the table. Option A gives $7^2 - 2 = 49 - 2 = 47 = L_8$ and is therefore the key. The technique used in option B gives $(L_6)^2 + 2 = 18^2 + 2 = 324 + 2 = 326$, but $L_{12} = 322$.

Item 36: Four Lucas numbers larger than those listed in the table were given. When 2786 is divided into one less than each one, only option C is a whole number (23), and since 23 is a prime number it follows the rule laid out in the additional information — 64079 is L_{23} .

Item 37: The problem posed in this item — about how many digits the number L_{300} contains — can be solved with a rates approach. Using the fact that $L_{78} (\approx 2 \times 10^{16})$ has 17 digits, it can be calculated that L_{312} has about $4 \times 17 = 68$ digits. This provides an upper bound that falls between options A and B (63 and 74), suggesting the key should be option A. Alternatively, the additional information also contained the information that L_{705} has 148 digits. There are 627 ($705 - 78$) Lucas numbers between L_{78} and L_{705} , which shows a length increase of 131 ($148 - 17$) digits. This suggests that, on average, the length of Lucas numbers increases by one digit every $627 \div 131 \approx 4.786$ increase in the suffix. So L_{300} should have about $(300 - 1) \div 4.786 \approx 62.47$ digits making option A (63) the best estimate. Marshalling the abundance of clues about how to solve this problem and choosing which is the best way to arrive at the estimate was part of this problem. That L_{705} has 148 digits and $705 \div 300 = 2.35$ can be used to calculate that L_{300} has about $148 \div 2.35 \approx 62.978$ digits ≈ 63 .

Unit 9 Poststructuralists

This unit's extract comments on the probably unfamiliar subject matter of poststructuralism and has a rather florid writing style. Despite appearances, students were not required to know anything about philosophy to gain a good understanding of the material.

Unit 10 Hydrocarbons

This unit was based on graphic conventions used to represent hydrocarbon molecules. The unit required skill in visualisation and pattern recognition.

Unit 11 Libraries

This unit is based on two opinions about the practice of culling library collections.

MC II commentary

This section gives a brief outline of each unit. Two units (22 and 23) are singled out for detailed analysis.

Unit 12 *Idealists*

The second testpaper opens with an item based on interpretation of a cartoon that comments on the differing perspectives of realists and idealists.

Unit 13 *Training zones*

This unit required students to manipulate several formulas that related maximum heart rate to age. The items involved substituting values into one or more of the formulas, or using simple algebra to solve problems.

Unit 14 *Rematch*

In this unit students worked with text that is a humorous and witty retake on the old fable about the hare and the tortoise.

Unit 15 *Quotations*

This unit required students to analyse a short quotation and to compare and contrast four other quotations.

Unit 16 *Makruk*

This unit is based on a board game from Thailand called Makruk. Movement rules were provided and students were required to understand how various pieces are permitted to move to be able to respond to the items.

Unit 17 *Humorous story*

The items in this unit are based on a text about the difference between what the author calls humorous stories and comic stories.

Unit 18 *Lakes*

This unit required students to locate and apply data about lakes. The data were presented in tabular form. Items included calculations and application of a formula for a measurement known as the shoreline development index.

Unit 19 *Bats*

This single-item unit required students to correctly describe the frequency of sound emitted by a bat, as represented in a graphical format.

Unit 20 *Power*

This unit is based on ways to measure the power output of electrical devices. The first item required students to translate a verbal description into mathematical symbols, while the second item required students to integrate two formulas and to substitute values into those formulas.

Unit 21 *History*

The items in this unit are based on an extract from a novel in which one of the characters gives his opinion about the writing of history.

Unit 22 Tone

In this unit, students were given information about a siren that was used in 19th century experiments with musical tones. The siren consisted of a metal disc that was caused to spin on its axis by a drive belt attached to a hand-operated drive-wheel. The disc had holes arranged in a band near its circumference, so all the holes were equidistant from the centre of the disc and from each other. The outlet of a tube, the other end of which was connected to an air pump, was positioned over the band of holes. When the pump was turned on and the siren's drive-wheel turned by hand, air 'puffed' through a hole whenever the tube outlet and a hole aligned. A series of rapid 'puffs' of air produced a tone.

Item 86: This item required students to determine how a siren with a 10-hole disc might produce a tone of the same pitch as one with a 12-hole disc. As the pitch of a tone depends on the number of 'puffs' per second, a siren with a 12-hole disc should spin more slowly than one with a 10-hole disc. The key is therefore option B. Option A is incorrect as it suggests that a siren with a 12-hole disc should spin faster than the other; this would produce a *higher* pitch. Options C and D are both incorrect because they suggest that placing the band of holes at different distances from the axis will have some effect on pitch. In fact, in a disc spinning on its axle, bands of holes nearer or further from the axis will pass the outlet of the tube at the same rate and will therefore produce the same pitch.

Item 87: Students were required to calculate the revolutions per minute that an 8-hole disc would need to complete to produce a tone of frequency 264 Hz. 264 puffs per second gives a frequency of 264 Hz, and an 8-hole disc is needed to complete a rotation 33 ($264 \div 8$) times per second to produce this frequency. In one minute, this disc will rotate 1980 (33×60) times. The key is thus option C. Option A gives the number of times per second. Option B uses the number of Hz. Option D multiplies the required Hz by the number of holes.

Item 88: This item describes a single disc that has three bands of holes at different distances from the axis. One band has 16 holes. This band gives a tone with a frequency $\frac{4}{3}$ times that of the second band, and the second band gives a frequency $\frac{3}{2}$ times that of the third band. Students were required to determine the number of holes in the third band. From the information given, the 16-hole band gives the highest frequency. So, the second band has three-quarters the number of holes as the first (12 holes), and the third has two-thirds the number of holes as the second band (8 holes). The key is thus option A. Option B is obtained by finding three-quarters of 16. Option C results from finding three-quarters of 16 and then multiplying 12 by $\frac{3}{2}$. Option D results from multiplying 16 by the product of $\frac{4}{3} \times \frac{3}{2}$; this yields 32.

Items 89–91 relied on some additional information relating to definitions of amplitude and wavelength.

Item 89: This item set up the following scenario: A person begins to turn the drive-wheel of a siren until a tone of a certain pitch is produced. The drive-wheel is then released and the siren allowed to slow down and return to silence. Four representations of changing frequency and amplitude were given and students were asked to choose the one that best graphed the stipulated scenario. Option A graphed a tone that maintained a constant pitch throughout, beginning quietly, becoming gradually louder and then gradually quieter until it was silent. Option B began with a high-pitched, quiet tone; as it became louder, it also became lower in pitch; the tone then became quieter and higher in pitch. Option C began with a quiet, highly-pitched tone; as it became louder it became lower in pitch and continued to become lower pitched as it returned to silence. With option D, the tone began quietly at a low pitch; as it increased in pitch it also became louder; it then became lower in pitch as it returned to silence. Option D is therefore the key.

For Items 90 and 91, further additional information was given in the form of a graph that showed the frequency wave patterns for three different tones labelled P, Q and R.

Item 90: Students were required to determine the frequency (in Hz) of tone Q. According to the graph, tone Q vibrates five times in 0.015 seconds; in one second there will be $\frac{5}{0.015}$ vibrations; this gives about 330 Hz; thus option C is the key. To obtain option A the graph is misread to give 3.3 vibrations in 0.015 seconds; this gives 220 Hz. Option B is the frequency for tone P (4 vibrations in 0.015 seconds) while option D is the frequency of tone R (6 vibrations in 0.015 seconds).

Item 91: Using the wavelength information for tones P and R, students were required to find a conversion factor that would give the number of holes needed to produce tone R based on the number of holes that produce tone P. In the same time period, P vibrates four times and R vibrates six times. As R vibrates more rapidly than P, the disc for R would require more holes. So, the number of holes in the disc for P should be multiplied by 6 and divided by 4, or multiplied by $\frac{3}{2}$. The key is therefore option A. Option B results if the need to increase the number of holes is misunderstood and the correct procedure is inverted, which would convert R to P. Option C uses a correct procedure, but finds the conversion factor from Q to R. Option D uses an incorrect procedure and finds the factor to convert Q to P.

Unit 23 *Sundial*

This unit is based on an extract from a play about a man named Ian Joyce and his wife Eloise, who believe that sundials are a much better way of keeping time than mechanical timepieces like clocks and watches.

Item 92: Ian's opposition to mechanical timepieces is that, being mechanical, they inevitably run fast or slow and so cannot be trusted. Sundials, by contrast, passively reflect (are 'acted upon' by) the natural movement of the sun, and thus cannot go wrong. It is the naturalness of the sundial's operation that is important to Ian, since he equates naturalness to truth (line 29). Thus option B is the key. Option A is incorrect because Ian is not primarily interested in the sundial's precision; he knows there are ways to correct any imprecision. Option C is incorrect, because the point of the sundial is that it continues to work properly without human intervention. Though building a sundial obviously requires some skill, it is not the level of skill that is at issue in the context of line 2; therefore option D is incorrect.

Item 93: In lines 20–27, Eloise's curious mix of zeal and self-doubt have her saying things that are guaranteed to get Mrs Stubbs's back up. We can appreciate that Mrs Stubbs feels she is being falsely accused by Eloise; option C is therefore the key. Given what we may infer from the extract, Ian is a bit arrogant and self-important. It is very likely that he (and possibly to some extent Eloise as well) looks down on Mrs Stubbs and her husband as being basically ignorant. But there is no evidence in the extract that Mrs Stubbs herself thinks the Joyces regard her and her husband as inferior; therefore option A is incorrect. Option B is incorrect because the Joyces are not in fact advocating that Mrs Stubbs live by a different time zone. Option D is incorrect because there is no evidence in the extract that Mrs Stubbs thinks she is the butt of a practical joke; on the contrary, her anger stems from her belief that the Joyces are being serious in their 'criticism' of her.

Item 94: Mrs Stubbs might be feisty and stubborn, and it is clear she knows little about sundials. But it cannot be argued that makes her naive or old-fashioned. It needs to be remembered that, as a technology, the sundial is old-fashioned as opposed to mechanical timepieces; so in fact it is the Joyces who might justly be accused of being old-fashioned, not Mrs Stubbs. It is doubtful that ignorance of an obsolete technology renders someone 'naive'. Option A is incorrect. Certainly Mrs Stubbs comes across as being straightforward in her manner and has an everyday knowledge of timekeeping technology. She can be described as being 'unsophisticated'. Lines 20–28 give the impression that Mrs Stubbs is an innocent; her sharp retort in line 31 makes it clear to us that she is nobody's fool after all she can see through Ian's bluster. Option B is the key. There is little evidence to sustain the notion that Mrs Stubbs is argumentative and obstinate (option C). Her defence of herself and her husband against Eloise's hamfisted comments is entirely reasonable. Nor does Mrs Stubbs offer counterarguments to Ian's comments in favour of sundials. She is certainly feisty, but not obstinate. As stated above, in line 31 Mrs Stubbs reveals herself to be wise to Ian's bluster. She understands more than the Joyces think she does. So it is incorrect to say she is unable to understand the simplest things (option D).

Item 95: This item required students to choose pairs of words that best described Eloise's personality. Option A is incorrect because there is no evidence that Eloise is either sceptical or questioning; on the contrary, she consistently supports her husband, and never questions his authority; in lines 15 and 16 she defers to his judgment. Option B is partly correct because Eloise does at least have kindly intentions toward Mrs Stubbs, even if she keeps putting her foot in her mouth and making the situation worse; but Eloise is the opposite of self-possessed — she is at sea, emotionally unstable, and looks for guidance from her husband. Option C is incorrect because Eloise demonstrates no ability to control the situation, particularly in relation to her interaction with Mrs Stubbs; Eloise's slavish deference to her husband should not be misconstrued as

inflexibility. Option D is the key: throughout the extract Eloise acts melodramatically – she grieves, she runs, she is in distress, and all over trivial matters, unlike Ian, who would never condescend to helping someone like Mrs Stubbs, Eloise at least tries to engage with her (in her own very clumsy way), and this reflects Eloise’s essential sensitivity.

Item 96: This item required students to understand the subtext of Ian’s final comment in this conversation. To do this properly, students need to have thought carefully about all of Ian’s other comments during the conversation, which together inform the meaning of this final comment. Option A can be eliminated easily, since neither in this comment nor in any previous comments has Ian shown the slightest doubt about his belief in sundials. Option B is incorrect because Ian’s final comment does not constitute an argument as such; rather, it stands closer to an affirmation of faith. Option D can be eliminated for similar reasons: since Ian is not presenting a reasoned argument with his final comment, he cannot be said to be a ‘voice of reason’; also, ‘lonely’ is not a word that one can readily attribute to Ian, given all his comments in this conversation. Ian’s final comment is a sort of stubborn – almost fanatical – affirmation of belief, dismissive of all other opinions. Option C is therefore the key.

Unit 24 *Conscience*

This unit required students to unpack the meanings of seven comments about conscience, and to compare and contrast their meanings.

Common Curriculum Elements (CCEs) and the MC format

Of the 49 CCEs, the following cannot be tested directly in MC format, though a few CCEs such as graphing, summarising and manipulating equipment, may be tested at ‘second order’ i.e. indirectly:

- 11 *Summarising/condensing written text*
- 12 *Compiling lists/statistics*
- 13 *Recording/noting data*
- 14 *Compiling results in a tabular form*
- 15 *Graphing*
- 20 *Setting out/presenting/arranging/displaying*
- 21 *Structuring/organising extended written text*
- 22 *Structuring/organising a mathematical argument*
- 26 *Explaining to others*
- 27 *Expounding a viewpoint*
- 46 *Creating/composing/devising*
- 53 *Observing systematically*
- 55 *Gesturing*
- 57 *Manipulating/operating/using equipment*
- 60 *Sketching/drawing.*

These CCEs can be validly tested in SR format.