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Specification B

Module 3 Higher Tier 43003H

Report on the Examination

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General

This was a slightly more demanding paper than recent ones and with few candidates attempting a Module 3 on this specification for the first time, the quality of responses was often a little disappointing, with few good attempts at the last couple of questions on each section.

Topics that were well done included:

- ratio
- calculator work.

Topics which candidates found difficult included:

- standard form
- repeated and reverse percentages
- proportionality.

Question 1

Though part (a) was well done a number of candidates at this level still did not know how to round an answer to one decimal place. Many moved the decimal point until there was only one figure after the decimal point so that 19.8545 became 19854.5. Others replaced the figures after one decimal place with zeros and others truncated instead of rounding.

Question 2

Many candidates read $\frac{1}{3}$ **off** as $\frac{1}{3}$ **of** Day 1 price and then used £15 for each extra day correctly to get an answer of 9 days. Others used £15 as the daily rate for the whole period to produce an answer of $\frac{165}{15}$ = 11 days. Others worked out $\frac{(165-45)}{15}$ but unfortunately forgot to add on the first day. Some thought that they only got £15 off the total so worked out 4 x 45 – 15 = 165 giving an answer of 4 days. Amongst the candidates who realised it was £45 for day 1, then £30 per day, the most successful method used was build-up with 45 + 30 + 30 + … up to 165 usually producing the correct answer, but those who used $\frac{(165-45)}{30}$ again often forgot to add on the first day.

Question 3

There were a pleasing number of fully correct answers although occasionally, answers were sometimes reversed which lost the final mark. A common error was to work out $\frac{126}{6}$ leading to 21 and 105. Part (b) was not done very well. Many added 9 to both numbers or to the wrong number. Many tried to work with 27 and the new total of 135. Answers of 1 : 5 were common, though some recovered from $\frac{135}{27}$ = 5 to get the correct ratio of 1 : 4.

Question 4

For more able candidates this was a good source of marks. Weaker candidates did not know what to do with the numbers, often just working out the actual increase of 24.

Question 5

Although the majority could do part (a), overall, the responses to this question were a little disappointing. Most found 32% (or 30% or one third both of which were deemed valid) of the total and then found that this was close to the China value. Others worked out the percentage that each country was out of the total and were then fortunate that China was second in the list. Unfortunately, many candidates made errors in their standard form giving values that were out by a factor of 10 or 100. Once again the instruction 'You **must** show your working' was ignored by a number of candidates. Changing all the values to ordinary numbers did not constitute sufficient working if nothing was actually then done with the numbers.

Question 6

Relatively few candidates used the efficient method of the multiplier of 0.96, many preferring to battle it out 9 times as separate calculations, which was not easy in the space provided. Whilst some are to be congratulated for making this long method work many fell by the wayside with premature approximation of values which, if working was not shown, lost the marks for method as well as accuracy if there was no evidence to show where the values were coming from. Quite a number of candidates opted to simply subtract 4 from 100 nine times.

Question 7

Part (a) was well done but in part (b) candidates either forgot to include the 7th prime number squared, thought it was something other than 17 or could not substitute into the expression successfully. Either way it was rare to see a convincing fully correct solution.

Question 8

These questions on proportionality are now familiar and the lack of a context in this question was expected to make for a better response. However, many seemed to have little idea what to do. Many candidates didn't take the first step of putting in the = k, but started to substitute in the numbers, and the usual mistake was to work out 3.6 ÷ 1.2 = 3. There were many answers of $x = \frac{3}{\sqrt{y}}$ or x proportional to $\frac{3}{\sqrt{y}}$. Considering the amount of help they were given in this question it was answered very badly.

Question 9

This question was not answered very well. Most candidates did not understand the idea of upper and lower bounds with many simply using the three given values in their calculation. Those who had some idea of bounds frequently used $\frac{\text{minimum} \times \text{minimum}}{\textbf{minimum}}$ to find the minimum value. Because P and Q were given correct to 1 significant figure and 2 significant figures respectively, many candidates used P as 5 and Q as 10 in their calculations. Some evaluated P + Q for the numerator often giving 1050 for the wrong reason. However, 45 or 55 were often seen as bounds for P but, not surprisingly, 995 was rarely seen as the lower bound for Q, although 1050 was often seen for the upper bound. Most had difficulty with bounds for R.

Question 10

Part (a) was quite well done but the success rate for the other two parts was low with the vast majority halving (a)(ii) to get (b) rather than doubling or completely starting again with an attempt at decimal long division.

Question 11

There was much confusion here about whether the numbers 5 and 30 should be divided $\frac{5}{30}$ or $\frac{30}{5}$. Many who made the right choice of $\frac{5}{30}$ then gave the answer as 6. Often 10 was seen with little indication of method which obviously was not penalised as there was no instruction to show method on this occasion but candidates are advised to either show their formula or scaling calculations whenever possible.

Question 12

Again the response to a very straight forward question on fraction arithmetic can only be described as patchy with most unable to do it. Few spotted the connection in part (b) and worked it all out again usually to the same degree of success as in part (a).

Question 13

A very straightforward question but unfortunately it was not done successfully. Perhaps it was the double negative that put candidates off but many were offering answers that were squares but not cubes.

Question 14

Part (a) was designed to give candidates a starting point rather than asking for the product of prime factors of 192. Sadly most candidates' first step was to try to multiply 8 and 24 and often not get 192 which was therefore the end of the possibility of marks for them. Those who attempted the question as intended often left the answer as $2^3 \times 3 \times 2^3$ or as $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$.

Question 15

Again standard form was not handled with confidence in this question. In part (b) conversions frequently had the wrong number of zeros or wrong power of 10. Those who attempted division of two decimals rarely had any idea of how to determine where to put the decimal point in their answer.

Question 16

Of those who seemed familiar with the word reciprocal most knew that $\frac{1}{40}$ was the reciprocal of 40; but few could change it to a decimal, for the second mark, often putting $\frac{1}{0.04}$ or 0.25.

Question 17

Attempts rested on whether or not the candidate realised that the 375 was the amount after the 25% increase. Most did not and so 10% of 375 = 37.5 was the most common starting point. A fair number actually did write 375 = 125% but could not continue and carried on as above. The minority who started correctly trying 375 ÷ 1.25 or similar had mixed fortunes. Many of those reaching 300 did so by realising that 25% of 300 is 75.

Question 18

Very few candidates could make any progress at all with this question. The most common errors were √20 + √45 + √80 becoming √145, √45 = √(5 x 9) then becoming 5√3 and 2√5 + 3√5 + 4√5 becoming 9√15.

Question 19

Most candidates were unfamiliar with negative and fractional indices and only the minority knew that recurring decimals could be written as fractions. The recurring decimal was often taken as 0.0377777777… whilst some thought that "equal" meant even. $81^{-\frac{3}{4}}$ was usually interpreted as either $\frac{3}{4}$ of 81 or 81 – $\frac{3}{4}$ of 81. There were lots of values of 60.75 seen. $(3^3)^{-1}$ was frequently taken as $3^3 - 1 = 27 - 1 = 26$. Amongst the few who knew what to do with recurring decimals, common errors were to obtain $\frac{37}{990}$ or $\frac{370}{999}$ as the equivalent fractions.