Question	Scheme		Marks	AOs
3(a)	$H_0 : \rho = 0$ $\quad H_1 : \rho > 0$		B1	2.5
	Critical value 0.3438		M1	1.1a
	(0.446 > 0.3438) so there is evidence that the product moment correlation coefficient (pmcc) is greater than 0/there is positive correlation		A1	2.2b
			(3)	
(b)	The value is close(r) to 1 **or** there is strong(er) (positive) correlation		B1	2.4
			(1)	
(c)	$\log_{10} y = -1.82 + 0.89(\log_{10} x)$	$y = ax^n \rightarrow$ $\log_{10} y = \log_{10}(ax^n)$	M1	1.1b
	$y = 10^{-1\,82+0\,89(\log_{10} x)}$	$\log_{10} y = \log_{10} a + \log_{10} x^n$	M1	2.1
	$y = 10^{-1\,82} \times 10^{0\,89(\log_{10} x)}$ $[= 10^{-1\,82} \times 10^{(\log_{10} x)^{0.89}}]$	$\log_{10} y = \log_{10} a + n\log_{10} x$ $[\log_{10} a = -1.82, n = 0.89]$	M1	1.1b
	$y = 0.015x^{0\,89}$	$y = 0.015x^{0\,89}$	A1A1	1.1b 1.1b
			(5)	
				(9 marks)

Notes

(a)

B1: for both hypotheses correct in terms of ρ

M1: for the critical value: sight of 0.3438 or any cv such that $0.25 < |cv| < 0.45$

A1: a comment suggesting a significant result/ H_0 is rejected on the basis of seeing +0.3438 **and** which mentions "pmcc/correlation/relationship" and "greater than 0/positive" (not just $\rho > 0$)

or an answer in context e.g. 'as "income"(o.e.) increases, "CO_2/emissions"(o.e.) increases'

A **contradictory** statement scores A0 e.g. 'Accept H_0, therefore positive correlation'

(b)

B1: for suitable reason e.g. *r* is close(r) to 1 **or** "strong(er)"/"near perfect" "correlation"

Do not allow 'association'

(c)

For both methods, once an M0 is scored, no further marks can be awarded and condone missing base 10 throughout

Method 1: (working to the model)

M1: Correct substitution for both *c* and *m* (may be implied by 2nd M1 mark)

M1: Making *y* the subject to give an equation in the form $y = 10^{a+b(\log_{10} x)}$ (may be implied by 3rd M1 mark)

M1: Correct multiplication to give an equation in the form $y = 10^a \times 10^{b(\log_{10} x)}$ (this line implies M1M1M1 provided no previous incorrect working seen)

Method 2: (working from the model)

M1: Taking the log of both sides (may be implied by 2nd M1 mark)

M1: Correct use of addition rule (may be implied by 3rd M1 mark)

M1: Correct multiplication of power (this line implies M1M1M1 provided no previous incorrect working seen)

A1: $n = 0.89$ **or** $a =$ awrt 0.015 **or** $y = ax^{0\,89}$ **or** $y =$ awrt$0.015x^n$ (**dep on M3**)

A1: $n = 0.89$ **and** $a =$ awrt 0.015 / $y =$ awrt$0.015x^{0\,89}$ (**dep on M3**)

do not award the final A1 if answer is given in an incorrect form e.g $y = 0.015 + x^{0\,89}$