

FURTHER LOGARITHMS KCSE QUESTIONS WITH ANSWERS

MODEL27042023

1

Find the value of x in the equation
 $\log_{10} 5 - 2 + \log_{10} (2x + 10) = \log_{10} (x - 4)$ (3marks)

2

Solve the equation below. (3 marks)

$$7^{2x} - 8 \times 7^x + 7 = 0$$

3

Use logarithms correct to 4 decimal places to evaluate. (3mks)

$$\sqrt{\frac{0.3698 \sin 56}{2.548}}$$

4

Solve the equation; $2 \log x - \log (x - 2) = 2 \log 3$

5

Evaluate without using mathematical tables, the expression

$$2 \log_{10} 5 - \frac{1}{2} \log_{10} 16 + 2 \log_{10} 40$$

6

Simplify

$$\frac{243^{\frac{-2}{5}} \times 125^{\frac{2}{3}}}{9^{\frac{-3}{2}}}$$

MARKING SCHEME

1

7. Find the value of x in the equation:
 $\log_{10} 5 - 2 + \log_{10} (2x+10) = \log_{10} (x-4)$

$$\log_{10} 5 - 2 \log_{10} 10 + \log_{10} (2x+10) = \log_{10} (x-4)$$

$$\log_{10} 5(2x+10) - \log_{10} 100 = \log_{10} (x-4)$$

$$\log_{10} \left(\frac{10x+50}{100} \right) = \log_{10} (x-4)$$

$$\frac{10x+50}{100} = \frac{x-4}{1}$$

(3marks)

$$10x+50 = 100(x-4)$$

$$10x+50 = 100x-400$$

$$50+400 = 100x-10x$$

$$\frac{450}{90} = \frac{90x}{90}$$

$$\underline{\underline{x=5}}$$

3

2

$7^x - 8.7x + 7 = 0$

Let $7^x = y$

$y^2 - 8y + 7 = 0$

$y^2 - 7y - y + 7 = 0$

$y(y-7) - 1(y-7) = 0$

$(y-1)(y-7) = 0$

$y = 1$ or $y = 7$

$7^x = 1$ or $7^x = 7^1$

$x = 0$ or $x = 1$

M1

M1

A1

No	Std Form	Log	
0.3698 Sin 56	3.698×10^{-1}	$\bar{1}.5680 +$ $\bar{1}.9918$	M1
2.548	2.548×10^0	$\bar{1}.5589 -$ 0.4062	M1
0.3774	← antilog	$\frac{\bar{1}.1536}{2} = \frac{\bar{2} + 1.1536}{2}$ $= \bar{1}.5768$	A1

$7^x - 8.7x + 7 = 0$
 Let $7^x = y$
 $y^2 - 8y + 7 = 0$
 $y^2 - 7y - y + 7 = 0$
 $y(y - 7) - 1(y - 7) = 0$
 $(y - 1)(y - 7) = 0$
 $y = 1$ or $y = 7$
 $7^x = 1$ or $7^x = 7^1$
 $x = 0$ or $x = 1$

$\text{Log}\left(\frac{x^2}{(x-2)}\right) = \log 3^2$
 $\frac{x^2}{x-2} = 9$
 $x^2 - 9x + 18 = 0$
 $(x-6)(x-3) = 0$
 $x = 6$ or $x = 3$

5. $2 \log_{10} 5 - 12 \log_{10} 16 + 2 \log_{10} 40$
 $\text{Log}\left(\frac{2 \times 5 \times 40}{4}\right) = \log 10000$
 $= 4$

6. $= \frac{243^{\frac{-2}{5}} \times 125^{\frac{2}{3}}}{9^{\frac{-3}{2}}}$
 $= \frac{27 \times 25}{9}$
 $= 75$

M1	✓ manipulation equivalent simplification
M1	
A1	
3	