Question	Scheme	Marks	AOs
13(a)	0.2 m^2	B1	3.4
		(1)	
(b)	$A = 0.2e^{0.3t}$ Rate of change = gradient $= \frac{dA}{dt} = 0.06e^{0.3t}$	M1	3.1b
	At $t = 5 \Rightarrow$ Rate of Growth is $0.06e^{1.5} = 0.269$ m^2/day	A1	1.1b
		(2)	
(c)	$100 = 0.2e^{0.3t} \Rightarrow e^{0.3t} = 500$	M1 A1	3.1a 1.1b
	$\Rightarrow t = \frac{\ln(500)}{0.3} = 20.7$ days 20 days 17 hours	M1 A1	1.1b 3.2a
		(4)	
(d)	The model given suggests that the pond is fully covered after 20 days 17 hours. Observed data is inconsistent with this as the pond is only 90% covered by the end of one month (28/29/30/31 days). Hence the model is not accurate	B1	3.5a
		(1)	
			(8 marks)

Notes:

(a)

B1: 0.2 m^2 oe

(b)

M1: Links rate of change to gradient and differentiates $0.2e^{0.3t} \rightarrow ke^{0.3t}$

A1: Correct answer 0.269 m^2/day

(c)

M1: Substitutes $A = 100$ and proceeds to $e^{0.3t} = k$

A1: $e^{0.3t} = 500$

M1: Correct method when proceeding from $e^{0.3t} = k \Rightarrow t = ..$

A1: 20 days 17 hours

(d)

B1: Valid conclusion following through on their answer to (c).