Q	Marking instructions	AO	Marks	Typical solution
16(a)	Obtains $\frac{1}{2}$	1.1b	B1	0.5
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
16(b)(i)	Obtains $\dfrac{\left(\dfrac{e^{1-(n+1)}\ \text{OE}}{2^{n+1}}\right)}{\left(\dfrac{e^{1-n}}{2^n}\right)}$ Or $\dfrac{e^{1-(n+1)\ \text{OE}}}{2^{n+1}} \times \dfrac{2^n}{e^{1-n}}$ Or substitutes an integer value for $n \geq 1$ correctly obtains $\frac{1}{2e}$ with no errors	2.1	B1	$\dfrac{u_{n+1}}{u_n} = \dfrac{\left(\dfrac{e^{1-(n+1)}}{2^{n+1}}\right)}{\left(\dfrac{e^{1-n}}{2^n}\right)}$ $= \dfrac{2^n e^{1-(n+1)}}{2^{n+1} e^{1-n}}$ $= 2^{-1} e^{-1}$ $= \dfrac{1}{2e}$
	Simplifies to obtain correct power of e or correct power of 2 starting from $\dfrac{\left(\dfrac{e^{1-(n+1)}}{2^{n+1}}\right)}{\left(\dfrac{e^{1-n}}{2^n}\right)}$ or $\dfrac{e^{1-(n+1)}}{2^{n+1}} \times \dfrac{2^n}{e^{1-n}}$ OE with at least one line of correct working before reaching $2^{-1}e^{-1}$ or $\frac{1}{2e}$ condone starting from $\dfrac{\left(\dfrac{e^{1-n+1}}{2^{n+1}}\right)}{\left(\dfrac{e^{1-n}}{2^n}\right)}$	1.1a	M1	
	Completes reasoned argument to show $\frac{u_{n+1}}{u_n} = \frac{1}{2e}$ CSO	2.1	R1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
16(b)(ii)	States $-1<\frac{1}{2e}<1$ Or states r = $\frac{1}{2e}$ and $-1<r<1$ Accept $0<\frac{1}{2e}<1$ OE	2.4	E1	$-1<\frac{1}{2e}<1$
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
16(c)	Substitutes their u_1 or $\frac{1}{2e}$ into sum to infinity formula	1.1a	M1	$\frac{\frac{1}{2}}{1-\frac{1}{2e}}$ $=\frac{1}{2\left(1-\frac{1}{2e}\right)}=\frac{e}{2e-1}$
	Substitutes $\frac{1}{2}$ and $\frac{1}{2e}$ into sum to infinity formula	1.1b	A1	
	Completes reasoned argument to obtain $\frac{e}{2e-1}$	2.1	R1	
	Subtotal		**3**	

	Question 16 Total		**8**	