Question Number	Scheme	Marks
3(a)	<table><tr><td>singers</td><td>*A*</td><td>*B*</td><td>*C*</td><td>*D*</td><td>*E*</td><td>*F*</td><td>*G*</td><td>*H*</td><td>*I*</td></tr><tr><td>Rank Jamil</td><td>3</td><td>1</td><td>2</td><td>9</td><td>7</td><td>5</td><td>4</td><td>8</td><td>6</td></tr><tr><td>Rank age</td><td>1</td><td>4</td><td>5</td><td>7</td><td>6</td><td>3</td><td>2</td><td>9</td><td>8</td></tr></table>	M1
	$\sum d^2 = 4+9+9+4+1+4+4+1+4[=40]$	M1A1
	$r_s = 1-\frac{6(40)}{9(80)}; = 0.6666..$ awrt 0.667	dM1A1
		(5)
(b)	$H_0: \rho = 0$, $H_1: \rho > 0$	B1
	Critical Value $r_s = 0.6$	B1
	Either reject H_0 / accept H_1 / Result is significant / $r_s = 0.666...$ does lie in the CR	M1
	conclude that there is evidence that Jamil can rank singers in order of age by listening to them sing	A1ft
		(4)
(c)	Give each singer a rank of 3.5	B1
	Use the pmcc	B1
		(2)
	Notes	**Total 11**

(a)

M1 Attempt to rank for Jamil's estimate and actual ages. (At least 5 correct in either row) (Allow reverse rankings)

M1 For finding difference between each of their **ranks** and evaluating $\sum d^2$ (may be implied by A1)

A1 $\sum d^2 = 40$

dM1 Dependent on the 2 previous M being awarded. Using $1-\frac{6'\sum d^2{}'}{9(80)}$

A1 Awrt 0.667

May see:

singers	*B*	*C*	*A*	*G*	*F*	*I*	*E*	*H*	*D*
Rank Jamil	1	2	3	4	5	6	7	8	9
Rank age	4	5	1	2	3	8	6	9	7

(b)

B1 Both hypotheses stated in terms of r or ρ_s.

B1 0.6 for CV

M1 For a correct non-contradictory statement relating their r_S $(|r_S| < 1)$ with their c.v.

where $|\text{their c.v.}| < 0.6$ allow 'Do not reject H_0', 'not significant', 'not in critical region' for the method mark

A1ft Dependent on all previous marks in (b) scored. Ft their answer to part(a)
For a correct contextualised comment which has rank, singer/voice and age.
Follow through their r_s with 0.6 (provided |their r_s| < 1)

Note: **Two-tailed test**
Applying a two-tailed test scores a maximum of B0B1M1A0
So Award SC B0B1 for $H_0: \rho = 0$, $H_1: \rho \neq 0$ followed by critical value $r_s = (\pm)\, 0.7$
and allow access to the M1 mark only.

(c)

B1 For use of rank 3.5

B1 Use pmcc (independent of 1st B1)