Question Number	Scheme	Marks
3 (a)	$\left[r = \frac{S_{xy}}{\sqrt{S_{xx}S_{yy}}} = \right] \frac{15.1608}{\sqrt{6.90181 \times 45.304}}$	M1
	$= 0.8573\ldots$ awrt 0.857	A1
		(2)
(b)	$H_0 : \rho = 0$, $H_1 : \rho > 0$	B1
	Critical value 5% = 0.5494	B1
	Significant evidence to suggest that there is a positive correlation between MR and BMI	B1
		(3)
(c)	MR and BMI measurements are normally (or bivariate normal) distributed	B1
		(1)
(d)	Ranks for MR: 9 10 6 7 8 4 5 1 2 3	B1
	$\sum d^2 = 1+9+9+1+4+1+16+9+9+1 [= 60]$	M1
	$r_s = 1 - \frac{6(60)}{10(99)}$	M1
	$= 0.6363$ awrt $(\pm) 0.636$	A1
		(4)
(e)	$[H_0 : \rho = 0$, $H_1 : \rho \neq 0]$	
	Critical value 0.6485	B1
	There is insufficient evidence of a correlation between MR and DPA	B1
		(2)

	Notes	Total 12
(a)	**M1**	for use of $\frac{S_{xy}}{\sqrt{S_{xx}S_{yy}}}$
	A1	awrt 0.857
(b)	**B1**	both hypotheses correct. Must be in terms of ρ. Must be attached to H_0 and H_1 Do not allow hypotheses in words on their own.
	B1	critical value of 0.5494
	B1	correct conclusion rejecting H_0 which must mention positive correlation, MR and BMI which must be consistent with their CV and their r, with |their CV| < 1 and |their r| < 1
(c)	**B1**	correct assumption referring to MR and BMI needing to be normally distributed
(d)	**B1**	attempt to rank MR (at least four correct) (may be implied by correct $\sum d^2$ or correct answer) allow reverse ranks for MR: 2 1 5 4 3 7 6 10 9 8
	M1	for finding the difference between each of the ranks and evaluating $\sum d^2$ (implied by $\sum d^2 = 60$ or for reverse ranks $\sum d^2 = 270$)
	M1	using $1 - \frac{6\sum d^2}{10(99)}$ with their $\sum d^2$
	A1	awrt $(\pm) 0.636$
(e)	**B1**	critical value of 0.6485 (or –0.6485 if $r_s < 0$)
	B1	correct conclusion which is not rejecting H_0, which must mention MR and DPA which must be consistent with their CV and their r_s, with |their CV| < 1 and |their r_s | < 1