| Question Number | Scheme | Marks |
|---|---|---|
| 1 (a) | $X$ = Number of items of litter found in a $2m^2$ area of the beach So $X \sim$ Po(8) | |
| | $P(X=5)=\frac{e^{-8}\times 8^5}{5!}$ or $P(X \leqslant 5)-P(X \leqslant 4)=0.1912-0.0996$ | M1 |
| | $=0.09160...$ awrt 0.0916 | A1 |
| | | (2) |
| (b) | $Y$ = Number of face masks found in a $5m^2$ area of the beach | |
| | $Y \sim$ Po(6) or $P(Y \geqslant 5)=1-P(Y \leqslant 4)=1-0.2851$ | M1 |
| | = 0.7149 awrt 0.715 | A1 |
| | | (2) |
| (c) | $W$ = Number of items of litter that are not face masks found in a $20m^2$ area of the beach | |
| | $W \sim N(56,56)$ | M1 |
| | $P(W<60)=P\left(Z<\frac{59.5-56}{\sqrt{56}}\right)$ | M1 M1 |
| | Tables $\left[=P(Z<0.47)\right]=0.6808$ calculator 0.68000… awrt 0.68 | A1 |
| | | (4) |
| | **Notes** | **Total 8** |

| | | |
|---|---|---|
| (a) | **M1** | for use of $\frac{e^{-8}\lambda^5}{5!}$ or $P(X \leqslant 5)-P(X \leqslant 4)$ |
| | **A1** | awrt 0.0916 (correct answer scores 2 out of 2) |
| (b) | **M1** | for writing or using Po(6)<br>**or** for a correct probability statement $1-P(Y \leqslant 4)$ or $P(Y \geqslant 5)$<br>e.g. $P(Y \geqslant 5)=1-P(Y \leqslant 5)$ is M0 |
| | **A1** | awrt 0.715 (correct answer scores 2 out of 2) |
| (c) | **M1** | for writing or using N(56, 56) may be seen in standardisation<br>(may be implied by the standardisation $\frac{x-56}{\sqrt{56}}$) |
| | **M1** | standardising with 59.5/60/60.5, their mean and their standard deviation |
| | **M1** | using a continuity correction 60 + 0.5 [=60.5] or 60 – 0.5 [=59.5] |
| | **A1** | awrt 0.68 (NB Use of exact Poisson gives 0.68617…and scores 0 out of 4) |