| Q | Scheme | Marks | Notes |
|---|---|---|---|
| **3a** | Use of $\mathbf{a}=\dfrac{\mathrm{d}\mathbf{v}}{\mathrm{d}t}$ $\left(\mathbf{a}=2\mathbf{i}+\dfrac{9}{2}t^{-\frac{1}{2}}\mathbf{j}\right)$ | M1 | Powers going down by 1<br>Must be in vector form. |
| | Use of $\mathbf{F}=2\mathbf{a}$ and $t=4$ | M1 | For their **a** Must be working in vector form. |
| | $\mathbf{F}=4\mathbf{i}+4.5\mathbf{j}$ | A1 | Any equivalent simplified form<br>ISW if go on to find magnitude |
| | | **(3)** | |
| **3b** | Use of $\mathbf{r}=\int \mathbf{v}\mathrm{d}t$ | M1 | Powers going up by 1<br>Must be in vector form. |
| | $\mathbf{r}=\left(t^2+10t\,(+a)\right)\mathbf{i}+\left(6t^{\frac{3}{2}}(+b)\right)\mathbf{j}$ | A1 | Condone missing constant of integration |
| | $\mathbf{r}=56\mathbf{i}+28\mathbf{j}$ | A1 | ISW if go on to find magnitude |
| | | **(3)** | |
| **3c** | Equate components of **v**<br>$\left(2t+10=9t^{\frac{1}{2}}\right)$ | M1 | |
| | Form quadratic in $t^{\frac{1}{2}}$ and solve for $t$<br>$\left(2\alpha^2-9\alpha+10=0\right)$ | M1 | Alternatively could square both sides to obtain<br>$4t^2-41t+100=0$<br>Need to see working if solving an incorrect quadratic equation or obtain incorrect answers. |
| | $\left((2\alpha-5)(\alpha-2)=0\right)$ $\quad t=4,\ \ t=6.25\ \ (6.3)$ | A1 | |
| | | **(3)** | |
| | | **[9]** | |