January 2014

## FOUNDATION TIER

| Question |  |  | Marking details | Marks |
| :---: | :---: | :---: | :---: | :---: |
| 1. | (a) (b) (c) | (i) <br> (ii) <br> (i) <br> (ii) | Second box ticked <br> Second box ticked <br> Arrow pointing up (can be anywhere) $\begin{aligned} & 20-5=\underline{15}[\mathrm{~N}] \\ & \frac{15(\mathrm{ecf})}{0.5}(1)=30\left[\mathrm{~m} / \mathrm{s}^{2}\right] \end{aligned}$ <br> Question total | 1 <br> 1 <br> 1 <br> 2 <br> [6] |
| 2. |  |  | slow neutrons (1) fission (1) moderator (1) neutrons (1) control rods (1) <br> Question total | 5 <br> [5] |
| 3. | (a) | (i) <br> (ii) <br> (iii) <br> (iv) | D <br> C <br> C <br> D <br> $50 \times 70(1-$ substitution $)=3500[\mathrm{~kg} \mathrm{~m} / \mathrm{s}](1)$ <br> ALTERNATIVE: <br> $55 \times 70=3850$ and $5 \times 70=350$ (1) <br> $3500[\mathrm{~kg} \mathrm{~m} / \mathrm{s}]$ (1) <br> Question total | 4 <br> 2 <br> [6] |

\begin{tabular}{|c|c|c|c|c|}
\hline \multicolumn{3}{|r|}{Question} \& Marking details \& Marks <br>
\hline 4. \& (a)
(b)

(c) \& \begin{tabular}{l}
(i) <br>
(ii) <br>
(iii) <br>
(i) <br>
(ii)

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\begin{aligned}
& \frac{4}{2}(1)=2[\Omega](1) \\
& 2 \times 4(1)=8[\mathrm{~W}](1) \\
& 2[\mathrm{~A}]
\end{aligned}
$$ <br>

Decreases (1) stays the same (1) <br>
Increase <br>
Bulbs can be switched separately / don't go out if one breaks (1) bulbs stay bright [when more added] / same voltage / current doesn't decrease or resistance doesn't increase (1) <br>
OR converse arguments about series circuits

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2 <br>
2 <br>
1 <br>
2 <br>
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2 <br>
[10]
\end{tabular} <br>

\hline 5. \& (a)
(b)

(c) \& \begin{tabular}{l}
(i) <br>
(ii) <br>
(iii) <br>
(i) <br>
(ii) <br>
(iii)

 \& 

Braking [distance] <br>
[Thinking distance] increases with speed (1) in proportion / in a linear manner / uniformly (1) <br>
Increase it (no reference to time) <br>
Steeper line shown through the origin (accept a curve provided always above the given line) <br>
$13[\mathrm{~m} / \mathrm{s}]$ <br>
8 [s] accept 6.8 [s] <br>
B (1) because time is shortest / area under graph smallest / biggest deceleration / steepest line (accept steeper than others) / biggest gradient / stops in only 5 s (1) <br>
Neutral - longest or shortest gradient <br>
Don't accept - stops at 5 s or steeper rate

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1
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2 <br>
1 <br>
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\end{tabular} <br>

\hline \& \& \& \& [9] <br>
\hline
\end{tabular}




