

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
AS LEVEL
Y413/01**

**FURTHER MATHEMATICS B (MEI)
Modelling with Algorithms
Printed Answer Booklet**

**THURSDAY 17 MAY 2018: Afternoon
TIME ALLOWED: 1 hour 15 minutes
plus your additional time allowance
MODIFIED ENLARGED 24pt**

First name						Last name					
Centre number						Candidate number					

YOU MUST HAVE:
Question Paper Y413/01
Formulae Further Mathematics B (MEI)
sent with the standard paper.

YOU MAY USE:
a scientific or graphical calculator

READ INSTRUCTIONS OVERLEAF



INSTRUCTIONS

The Question Paper will be found with the Printed Answer Booklet.

Use black ink. HB pencil may be used for graphs and diagrams only.

Complete the boxes provided on the Printed Answer Booklet with your name, centre number and candidate number.

Answer ALL the questions.

WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED IN THE PRINTED ANSWER BOOKLET. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.

You are permitted to use a scientific or graphical calculator in this paper.

Final answers should be given to a degree of accuracy appropriate to the context.

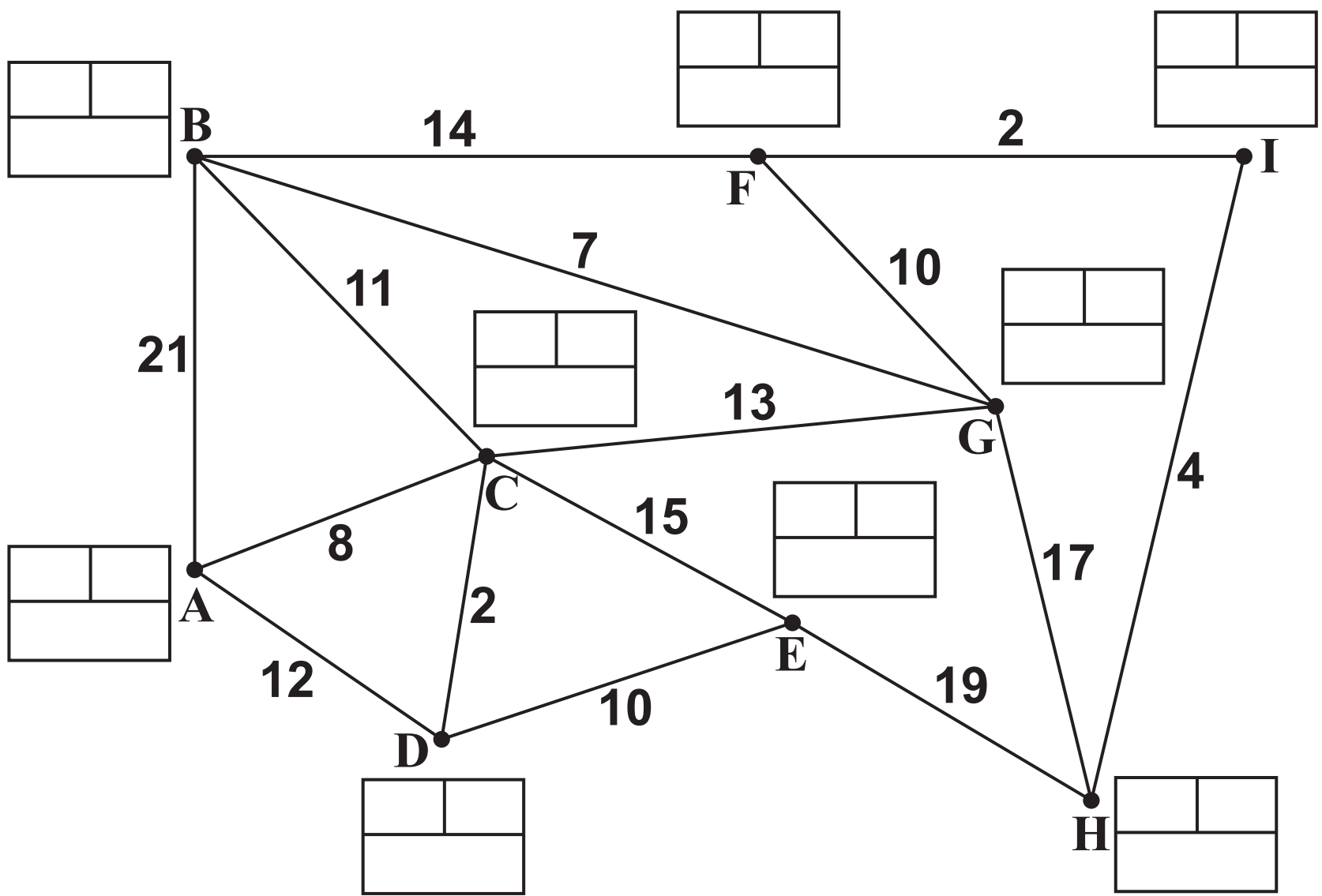
INFORMATION

You are advised that an answer may receive NO MARKS unless you show sufficient detail of the working to indicate that a correct method is used. You should communicate your method with correct reasoning.

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1(i)



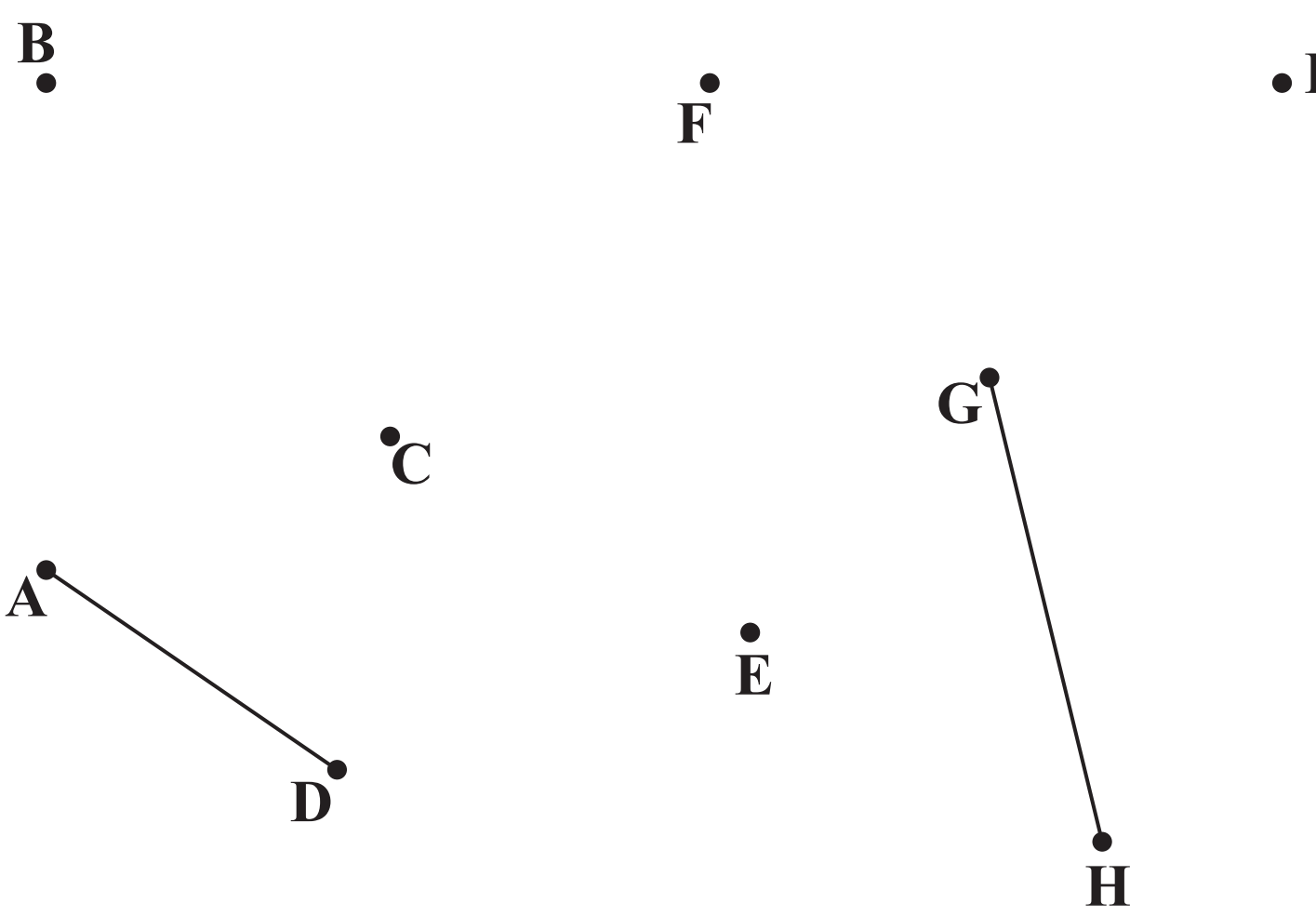
Key:

Order of becoming permanent

Permanent label

Temporary labels (working values)

Do not cross out your temporary labels

<div>1(ii)</div>	<div> <div> <div>CD = 2</div> <div>FI = 2</div> <div>HI = 4</div> <div>BG = 7</div> <div>AC = 8</div> <div>FG = 10</div> <div>DE = 10</div> <div>BC = 11</div> <div>CG = 13</div> <div>BF = 14</div> <div>CE = 15</div> <div>EH = 19</div> <div>AB = 21</div> </div> <div>  </div> <div> <div>Total length of arcs in spanning tree =</div> <div></div> </div> </div>
<div>1(iii)</div>	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>

2(i)	
2(ii)(A)	
2(ii)(B)	
2(iii)	
2(iv)	<pre> graph LR S((S)) --> A((A)) S --> D((D)) S --> T((T)) S --> C((C)) S --> B((B)) A --> D A --> E((E)) D --> E C --> F((F)) C --> B F --> B B --> E B --> G((G)) E --> G E --> T G --> T </pre>

3(i)	12	34	15	23	10	25	
3(ii)							

3(iii)	
4(i)(A)	

4(i)(B)	
4(ii)(A)	
4(ii)(B)	
4(iii)(A)	
4(iii)(B)	
4(iv)(A)	

5(ii)(B)	
5(iii)	

6(i)										
	Q	P	x	y	z	s_1	s_2	s_3	a_1	RHS
	(answer space continued on next page)									

6(i) (continued)																																															
6(ii)																																															
6(iii)																																															
<table><tr><td>P</td><td>x</td><td>y</td><td>z</td><td>s_1</td><td>s_2</td><td>s_3</td><td>RHS</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>								P	x	y	z	s_1	s_2	s_3	RHS																																
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6(iii) (continued)																																								
	<table><tr><td><i>P</i></td><td><i>x</i></td><td><i>y</i></td><td><i>z</i></td><td><i>s</i>₁</td><td><i>s</i>₂</td><td><i>s</i>₃</td><td>RHS</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	<i>P</i>	<i>x</i>	<i>y</i>	<i>z</i>	<i>s</i> ₁	<i>s</i> ₂	<i>s</i> ₃	RHS																															
<i>P</i>	<i>x</i>	<i>y</i>	<i>z</i>	<i>s</i> ₁	<i>s</i> ₂	<i>s</i> ₃	RHS																																	
6(iv)																																								
6(v)																																								

6(vi)	

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).



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