

**OCR**

Oxford Cambridge and RSA

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**A Level Further Mathematics B (MEI)****Y433 Modelling with Algorithms**

Printed Answer Booklet

**Date – Morning/Afternoon**

Time allowed: 1 hour 15 minutes

**OCR supplied materials:**

- Printed Answer Booklet
- Formulae Further Mathematics B (MEI)

**You must have:**

- Printed Answer Booklet
- Formulae Further Mathematics B (MEI)
- Scientific or graphical calculator



First name

Last name

Centre  
numberCandidate  
number**INSTRUCTIONS**

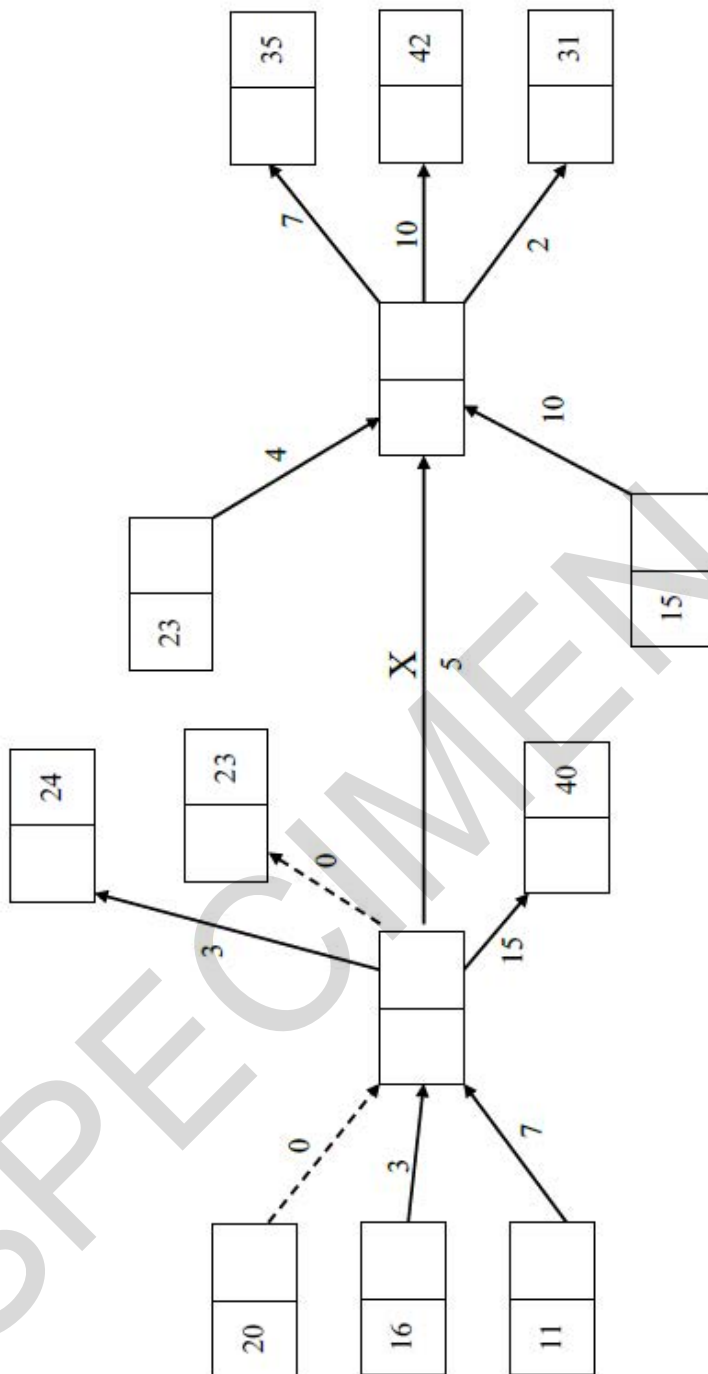
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Complete the boxes provided on the Printed Answer Booklet with your name, centre number and candidate number.
- Answer **all** the questions.
- **Write your answer to each question in the space provided in the Printed Answer Booklet.**
- Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.
- 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.
- The Printed Answer Booklet consists of **16** pages. The Question Paper consists of **12** pages.

<b>1 (i)</b>	
<b>1 (ii)</b>	
<b>1 (iii)</b>	
<b>1 (iv)</b>	

2



A spare copy of the diagram for question 2 can be found on page 14

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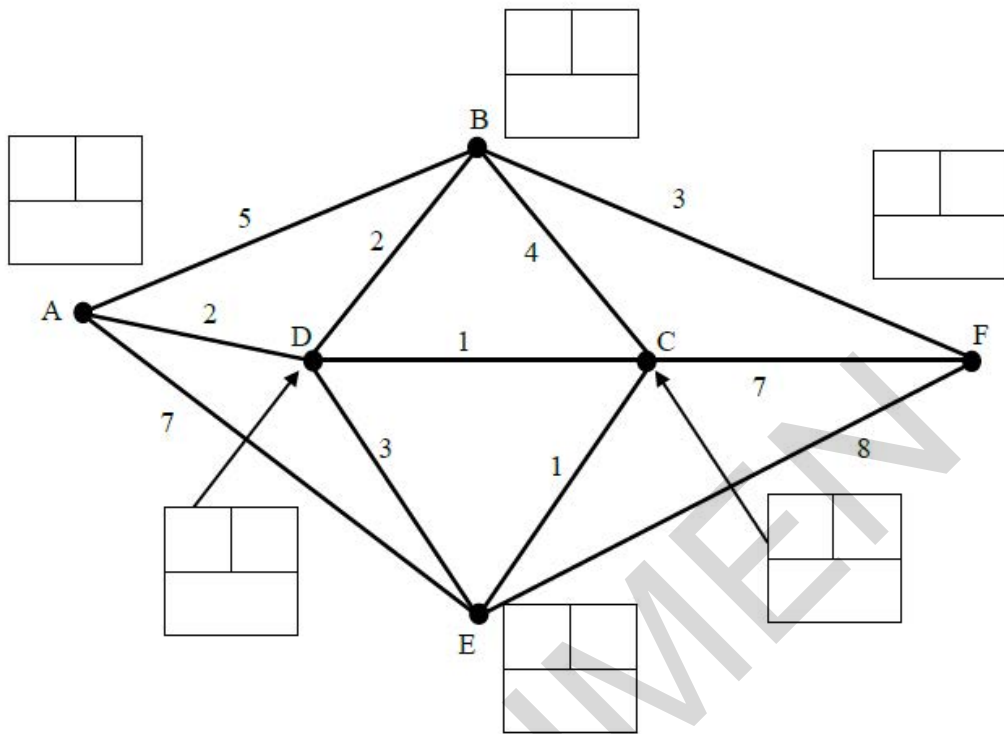


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3 (i)



	A	B	C	D	E	F
A	-	4	3	2	4	
B	4	-	3	2	4	
C	3	3	-	1	1	
D	2	2	1	-	2	
E	4	4	1	2	-	
F						-

A spare copy of the diagram and table for question 3 (i) can be found on page 15

<b>3 (ii)</b>	
<b>3 (iii)</b>	

SPECIMEN

**DO NOT WRITE IN THIS SPACE**

4 (i)


4 (ii)


4 (iii)


SPECIMEN

5 (i)

	A	B	C	D	E	F	G	H	I	J
A			8	4						
B					10				7	
C	8			6			12			
D	4		6					6		7
E		10				8			9	
F					8				8	
G			12					6		9
H				6			6			7
I		7			9	8				
J				7			9	7		

A spare copy of the table for question 5 (i) can be found on page 16

5 (ii)

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5 (iii)  
(A)

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5 (iii)  
(B)

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<b>5 (iv)</b> (A)	
<b>5 (iv)</b> (B)	
<b>5 (iv)</b> (C)	
<b>5 (v)</b>	

SPECIMEN



<b>5 (vi)</b>	
<b>6 (i)</b>	

SPECIMEN

6 (ii) [You may not need to use all of these tableaux]  
 (A)

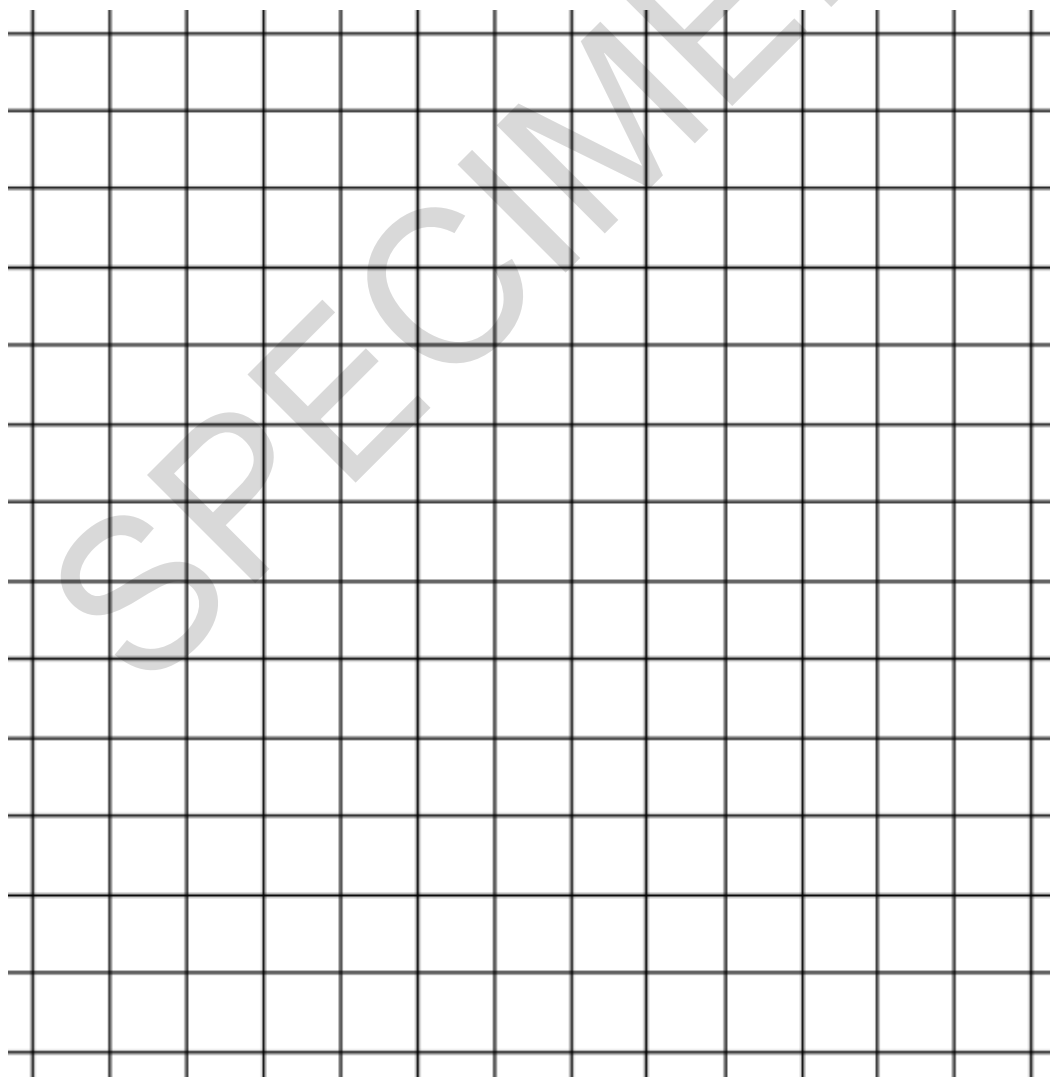
$P$	$x$	$y$	$z$	$s_1$	$s_2$	$s_3$	$s_4$	RHS
1	0	1.75	-0.5	0	0	0	1.25	37.5
0	0	3.5	2	1	0	0	-0.5	5
0	0	2	1	0	1	0	0	10
0	0	2.5	1	0	0	1	-0.5	55
0	1	0.75	0.5	0	0	0	0.25	7.5

$P$	$x$	$y$	$z$	$s_1$	$s_2$	$s_3$	$s_4$	RHS

$P$	$x$	$y$	$z$	$s_1$	$s_2$	$s_3$	$s_4$	RHS

**6 (ii)**  
(B)

**6 (iii)**



7 (i)	

7 (ii) (A)	

7 (ii) (B)	

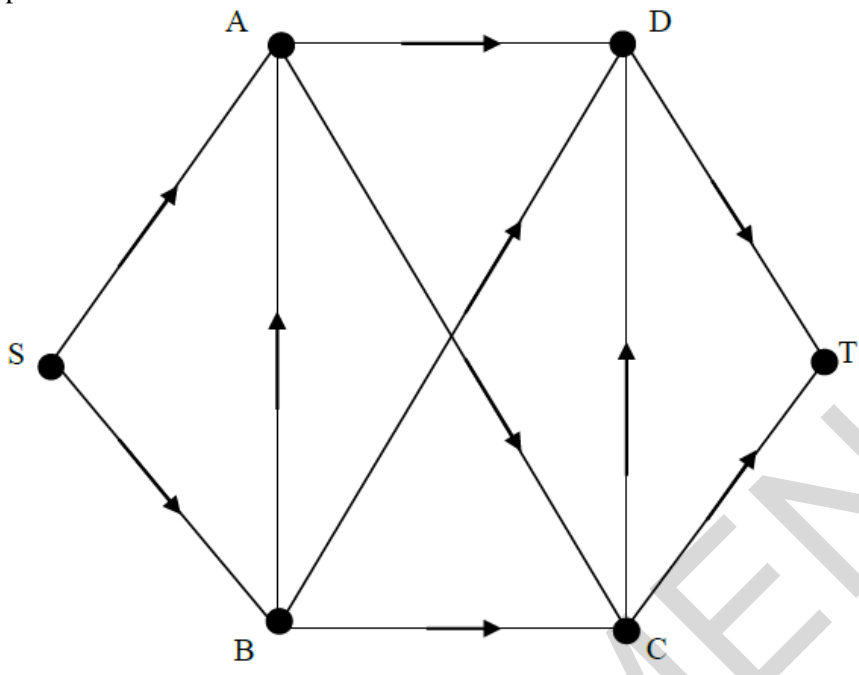
7 (ii) (C)	

7 (iii) (A)	<p>Online LP Solver</p> <pre>graph LR; S((S)) --&gt; A((A)); S((S)) --&gt; B((B)); A((A)) --&gt; B((B)); A((A)) --&gt; D((D)); B((B)) --&gt; C((C)); C((C)) --&gt; A((A)); C((C)) --&gt; D((D)); D((D)) --&gt; T((T)); C((C)) --&gt; T((T));</pre>
	<p>(answer space continues on next page)</p>

7 (iii)  
(A)

(continued)

Spreadsheet LP Solver



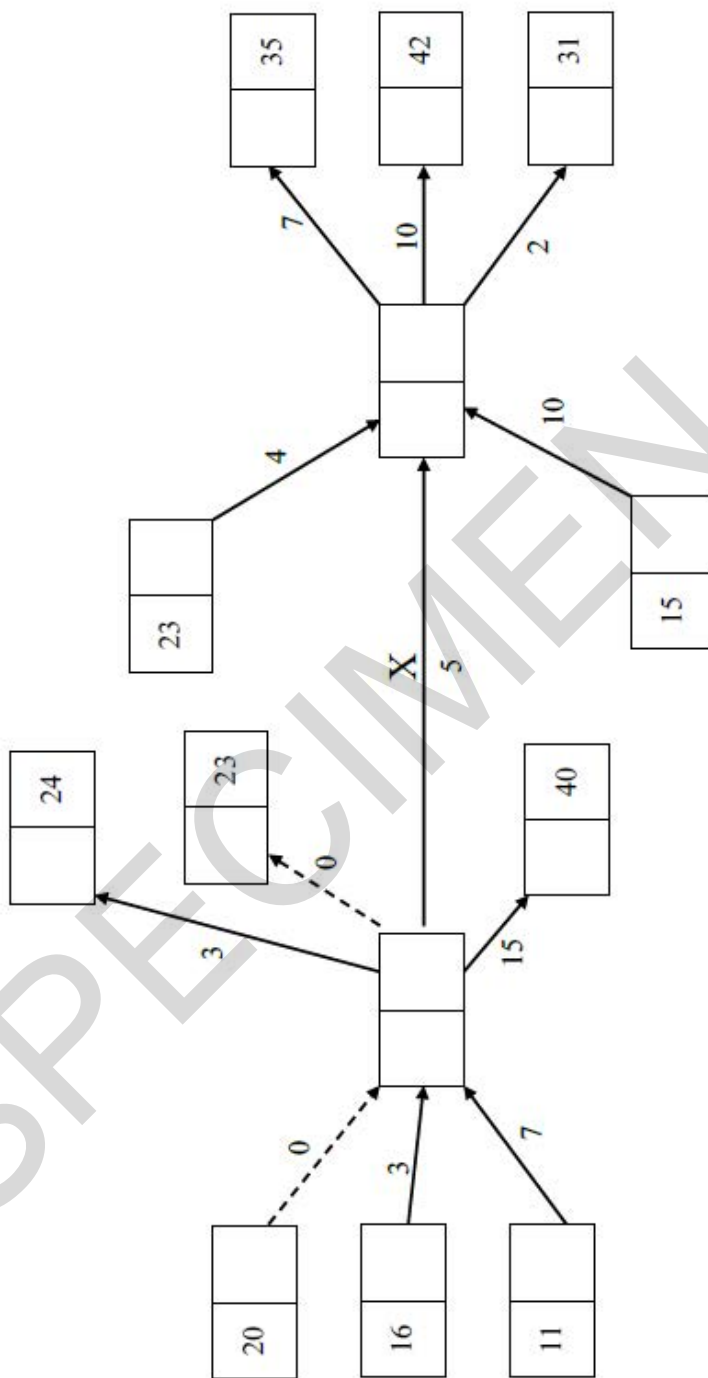
7 (iii)  
(B)

7 (iv)

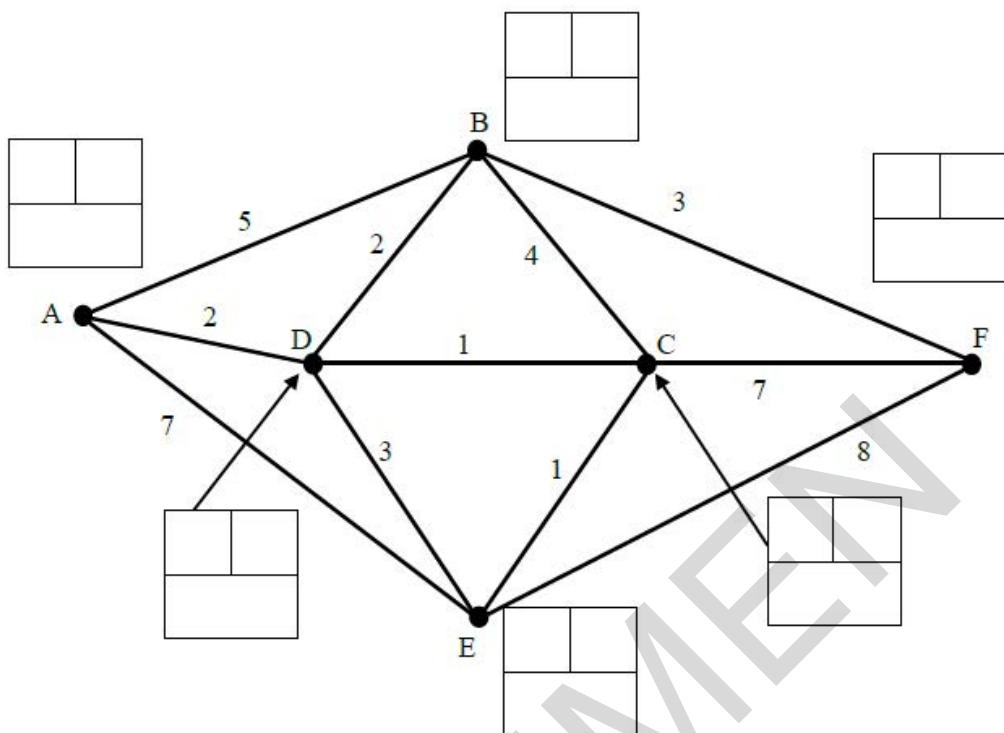
7 (v)

SPECIMEN

Spare copy of diagram for question 2



Spare copy of diagram and table for question 3 (i)



	A	B	C	D	E	F
A	-	4	3	2	4	
B	4	-	3	2	4	
C	3	3	-	1	1	
D	2	2	1	-	2	
E	4	4	1	2	-	
F						-

## Spare copy of table for question 5 (i)

	A	B	C	D	E	F	G	H	I	J
A			8	4						
B					10				7	
C	8			6			12			
D	4		6					6		7
E		10				8			9	
F					8				8	
G			12					6		9
H				6			6			7
I		7			9	8				
J				7			9	7		

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