

A Level Further Mathematics A

Y544/01 Discrete Mathematics

Printed Answer Booklet

Time allowed: 1 hour 30 minutes

You must have:

- Question Paper Y544/01 (inside this document)
- the Formulae Booklet for A Level Further Mathematics A
- a scientific or graphical calculator

AB



Please write clearly in black ink. **Do not write in the barcodes.**

Centre number

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Candidate number

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First name(s)

Last name

INSTRUCTIONS

- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided in the **Printed Answer Booklet**. If you need extra space use the lined pages at the end of the Printed Answer Booklet. The question numbers must be clearly shown.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.
- Give non-exact numerical answers correct to **3** significant figures unless a different degree of accuracy is specified in the question.
- The acceleration due to gravity is denoted by $g \text{ m s}^{-2}$. When a numerical value is needed use $g = 9.8$ unless a different value is specified in the question.

INFORMATION

- The total mark for this paper is **75**.
- The marks for each question are shown in brackets [].
- This document has **16** pages.

ADVICE

- Read each question carefully before you start your answer.

1(a)**1(b)**

	A	B	C	D	E	F	G
A	–	120	100	230	260	150	200
B	120	–	180	210	200	250	280
C	100	180	–	235	190	170	270
D	230	210	235	–	170	185	210
E	260	200	190	170	–	210	270
F	150	250	170	185	210	–	195
G	200	280	270	210	270	195	–

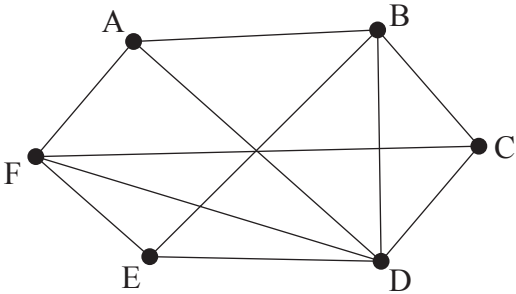
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1(c)

(answer space continued on next page)

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1(d)																																																																								

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2(a)(i)																																																		
2(a)(ii)																																																		
2(a)(iii)																																																		
2(b)(i)	To <table><tr><td></td><td>J</td><td>K</td><td>L</td><td>M</td><td>N</td><td>O</td></tr><tr><td>J</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td></tr><tr><td>K</td><td>2</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>L</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr><tr><td>M</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td></tr><tr><td>N</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td></tr><tr><td>O</td><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td></tr></table> From		J	K	L	M	N	O	J	0	1	1	0	1	0	K	2	0	1	1	0	0	L	1	1	0	1	1	1	M	0	0	1	1	0	1	N	1	0	1	0	0	1	O	0	1	0	1	1	0
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2(b)(ii)																																																		

3(a)	
3(b)	142 165 152 135 171 154 172 182
	List at end of 2nd Pass:
	List at end of 3rd Pass:
3(c)	
3(d)	
	Approximately: numbers

4(a)(i)	
	Minimum Project Completion Time: hours
4(a)(ii)	

4(b)

4(c)

Worker 1																
Worker 2																
Worker 3																
Worker 4																
Worker 5																

Spare diagram (if needed)

Worker 1																
Worker 2																
Worker 3																
Worker 4																
Worker 5																

Minimum Number of Workers:

4(d)

Range of Values of t :

5(a)**5(b)**

	X	Y	Z
P	1	2	-1
Q	3	0	2
R	-1	4	-2

5(c)**5(d)**

Cell:

New Pay-Off Value:

5(e)

5(f)(i)	
5(f)(ii)	Optimal Mixed Strategy for Player B:
	Value of m:

6(a)	

6(b)	

P	x	y	z	r	s	t	RHS

Spare grid (if needed)

P	x	y	z	r	s	t	RHS

6(c)(i)								

6(c)(ii)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 12.5%;">P</th> <th style="width: 12.5%;">x</th> <th style="width: 12.5%;">y</th> <th style="width: 12.5%;">z</th> <th style="width: 12.5%;">r</th> <th style="width: 12.5%;">s</th> <th style="width: 12.5%;">t</th> <th style="width: 12.5%;">RHS</th> </tr> <tr><td style="height: 25px;"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td style="height: 25px;"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td style="height: 25px;"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td style="height: 25px;"></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>								P	x	y	z	r	s	t	RHS																																
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P	x	y	z	r	s	t	RHS																																								

6(d)	
6(e)	
	$k =$

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7(a)	
7(b)	

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[illegible]

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