OCR
Oxford Cambridge and RSA

Thursday 22 June 2023 – Afternoon

A Level Further Mathematics A

Y544/01 Discrete Mathematics

Printed Answer Booklet

Time allowed: 1 hour 30 minutes

AB

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

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

Centre number | | | | | | Candidate number | | | | |

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 $g\,\mathrm{m\,s^{-2}}$. 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)&(b)	
	Minimum project completion time:
1(c)	
	Minimum project completion time:

2(a)	
2(b)	
2(c)	
2(d)	

3(a)

P	x	y	z	s	t	RHS
1	-2	3	-1	0	0	0
0	5	-4	1	1	0	20
0	2	-1	0	0	1	6

P	x	y	z	s	t	RHS

P	x	y	z	s	t	RHS

3(b)

$P =$

$x =$ $y =$ $z =$

$s =$ $t =$

3(c)

3(d)

If needed for working:

P	x	y	z	s	t	RHS

P	x	y	z	s	t	RHS

4(a)	
4(b)	
4(c)	

4(d)	

DO NOT WRITE IN THIS SPACE

5(a)	Original list	3	24	8	1	4	20	30	18
	First pass								
	Second pass								
5(b)(i)									
5(b)(ii)									
5(c)									

5(d)

6(a)

6(b)

Total weight =

6(c)

Total weight =

6(d)(i)	
	Lower bound =
6(d)(ii)	
	Upper bound =
6(e)	

7(a)(i)

Player 2

Player 1	A	B	C	
X	2	−3	−4	
Y	0	1	3	
Z	−2	2	4	

Play-safe strategy for player 1 is

Play-safe strategy for player 2 is

7(a)(ii)

7(b)

7(c)

7(d)

$x =$ $y =$ $z =$

Value of the game to player 1 =

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).