



Thursday 20 June 2019 – Morning

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 (inserted)
- Formulae A Level Further Mathematics A

You may use:

· 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

- The Question Paper will be found inside the Printed Answer Booklet.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- 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 the Printed Answer Booklet. The question number(s) must be clearly shown.
- You are permitted to use a scientific or graphical calculator in this paper.
- 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 $gm\,s^{-2}$. Unless otherwise instructed, when a numerical value is needed, use g=9.8.

INFORMATION

- · You are reminded of the need for clear presentation in your answers.
- The Printed Answer Booklet consists of 12 pages. The Question Paper consists of 8 pages.

1(a)(i)	A C	B D E	$P \bullet Q$ $R \bullet S$
_			
1(a)(ii)			
	Vertices	A, B, C, D, E	V = 5
	Edges	AB, AC, AE, BC, BD, BE	E =
	Regions		R =
1(b)			
1(c)			

2(a)	Activity	Immediate predecessors	
	A		
	В		
	С		
	D		
	Е		
	F		
2(b)	Activity	Latest start time (days)	
, ,		Latest start time (days)	
	B C		
	F		
	Γ		
2(c)			
2(d)(i)			
2(d)(ii)			

4

3(a)								
3(b)								
	P 1	2	у	<i>z</i>	S	<i>t</i>	RHS	
	0	$\frac{-2}{1}$	0	1	0	0	60	
	0	2	3	4	0	1	60	
				I.				
				I	I			
	P	Х	У	z	S	t	RHS	
3(c)								

4 (a)							
4(b)							
4 (b)							
4 (c)							
,							
4(d)		41	17	8	33	29	
,							
4(e)							
4.0							
4 (f)			Worst case			Comparisons	
	Quick sort						
	Bubble sort						

A	- A	B 130	C 100	D -	E -	F 250	G -	H -
В	130		-	50	-	-	170	100
С	100		-	-	80	170	-	90
D	-	50	-	-	-	-	120	-
Е	-	-	80	-	-	140	-	120
F	250		170	-	140	-	-	-
G	-	170	-	120	-	-	-	90
Н	-	100	90	_	120	-	90	-
	A B C D							
	F							
	G				1		0	
	Н							

5 (d)	
5(e)(i)	
5(e)(ii)	

6(a)	
6(b)	
O(D)	
6(c)	
0(0)	
	X Y Z
	A $(x, 1)$ $(4, -2)$ $(2, 0)$
	B $(3,-1)$ $(6,-4)$ $(-1,3)$

	A B	X	Y	Z		

7 (a)	
7(b)	
,	
,	
7 (c)	

7 (d)	

12 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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