



Oxford Cambridge and RSA

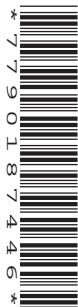
Thursday 20 June 2019 – Morning

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

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Candidate number

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First name(s)

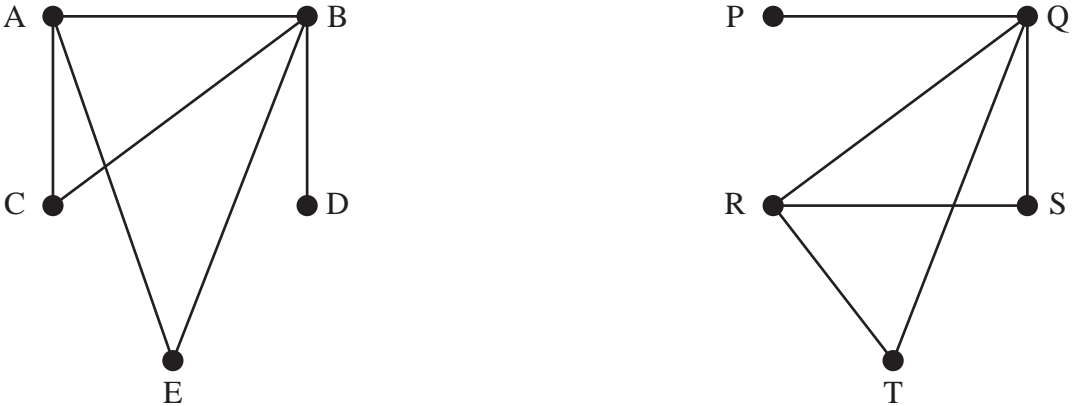
Last name

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 $g \text{ m s}^{-2}$. 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)										
1(a)(ii)	<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 20px;"> <tr> <td style="padding: 5px;">Vertices</td> <td style="padding: 5px;">A, B, C, D, E</td> <td style="padding: 5px;">$V = 5$</td> </tr> <tr> <td style="padding: 5px;">Edges</td> <td style="padding: 5px;">AB, AC, AE, BC, BD, BE</td> <td style="padding: 5px;">$E =$</td> </tr> <tr> <td style="padding: 5px;">Regions</td> <td style="padding: 5px;"></td> <td style="padding: 5px;">$R =$</td> </tr> </table>	Vertices	A, B, C, D, E	$V = 5$	Edges	AB, AC, AE, BC, BD, BE	$E =$	Regions		$R =$
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Regions		$R =$								
1(b)										
1(c)										

2(a)	Activity	Immediate predecessors
	A	
	B	
	C	
	D	
	E	
	F	

2(b)	Activity	Latest start time (days)
	B	
	C	
	F	

2(c)	

2(d)(i)	

2(d)(ii)	

4(a)														
4(b)														
4(c)														
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4(e)														
4(f)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;"></th> <th style="width: 40%; text-align: center;">Worst case</th> <th style="width: 40%; text-align: center;">Comparisons</th> </tr> </thead> <tbody> <tr> <td>Quick sort</td> <td></td> <td></td> </tr> <tr> <td>Bubble sort</td> <td></td> <td></td> </tr> </tbody> </table>						Worst case	Comparisons	Quick sort			Bubble sort		
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5(d)	

5(e)(i)	

5(e)(ii)	

6(d)

	X	Y	Z
A			
B			

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

7(d)	

