

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
AS GCE**

4736/01

MATHEMATICS

Decision Mathematics 1

PRINTED ANSWER BOOK

WEDNESDAY 13 JUNE 2018: Morning

**DURATION: 1 hour 30 minutes
plus your additional time allowance**

MODIFIED ENLARGED

| | | | |
|-----------------------|--|----------------------|--|
| First name | | Last name | |
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|--------------------------|--|--|--|--|--|-----------------------------|--|--|--|--|
| Centre number | | | | | | Candidate number | | | | |
|--------------------------|--|--|--|--|--|-----------------------------|--|--|--|--|

Candidates answer on this Printed Answer Book.

OCR SUPPLIED MATERIALS:

Question Paper 4736/01

List of Formulae (MF1) sent with standard paper

OTHER MATERIALS REQUIRED:

Scientific or graphical calculator

READ INSTRUCTIONS OVERLEAF



INSTRUCTIONS TO CANDIDATES

These instructions are the same on the Printed Answer Book and the Question Paper.

Write your name, centre number and candidate number in the spaces provided on the Printed Answer Book. Please write clearly and in capital letters.

WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED IN THE PRINTED ANSWER BOOK. If additional space is required, you should use the lined page(s) at the end of the Printed Answer Book. The question number(s) must be clearly shown.

Use black ink. HB pencil may be used for graphs and diagrams only.

Answer ALL the questions.

Read each question carefully. Make sure you know what you have to do before starting your answer.

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 or is clearly appropriate.

INFORMATION FOR CANDIDATES

This information is the same on the Printed Answer Book and the Question Paper.

The number of marks is given in brackets [] at the end of each question or part question on the Question Paper.

YOU ARE REMINDED OF THE NEED FOR CLEAR PRESENTATION IN YOUR ANSWERS.

The total number of marks for this paper is 72.

1 (i)

| | | | | | | | | |
|--------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Shop | A | B | C | D | E | F | G | H |
| Boxes | 500 | 400 | 600 | 300 | 300 | 400 | 300 | 200 |

Van 1:

Van 2:

Van 3:

Van 4:

1 (ii)

| | | | | | | | | |
|--------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Shop | A | B | C | D | E | F | G | H |
| Boxes | 500 | 400 | 600 | 300 | 300 | 400 | 300 | 200 |

Van 1:

Van 2:

Van 3:

Van 4:

| | | | | | | | | | |
|----------------|---------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1 (iii) | | | | | | | | | |
| | Shop | A | B | C | D | E | F | G | H |
| | Boxes | 500 | 400 | 600 | 300 | 300 | 400 | 300 | 200 |
| | | | | | | | | | |
| | Van 1: | | | | | | | | |
| | Van 2: | | | | | | | | |
| | Van 3: | | | | | | | | |
| 1 (iv) | | | | | | | | | |
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2 (i)

| <i>M</i> | <i>N</i> | <i>P</i> |
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2 (ii)

| <i>M</i> | <i>N</i> | <i>P</i> |
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| 3 (i) | | | | | | | |
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| 3 (ii) | | | | | | | |
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| 3 (iii) | | | | | | | |
| | <i>P</i> | <i>x</i> | <i>y</i> | <i>s</i> | <i>t</i> | <i>u</i> | RHS |
| | 1 | −2 | 4 | 0 | 0 | 0 | 0 |
| | 0 | 4 | −12 | 1 | 0 | 0 | 12 |
| | 0 | 7 | −19 | 0 | 1 | 0 | 35 |
| | 0 | −3 | 15 | 0 | 0 | 1 | 0 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

A spare copy of this diagram can be found on page 10.

| <i>P</i> | <i>x</i> | <i>y</i> | <i>s</i> | <i>t</i> | <i>u</i> | RHS |
|----------|----------|----------|----------|----------|----------|------------|
| | | | | | | |
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| | | | | | | |

(answer space continued on next page)

3 (iii) (continued)

Spare copy of the diagram for question 3(iii).

| <i>P</i> | <i>x</i> | <i>y</i> | <i>s</i> | <i>t</i> | <i>u</i> | RHS |
|----------|----------|----------|----------|----------|----------|------------|
| | | | | | | |
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| | | | | | | |

3 (iv)

P = _____ *x* = _____ *y* = _____

s = _____ *t* = _____ *u* = _____

| | |
|--------------|--|
| 3 (v) | |
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4 (i)

4 (ii)

$$M$$
$$N$$

P

 R

S

$$M$$

6

7

$$N$$

5

4

P

6

3

2

 R

5

3

4

S

7

4

2

4

Arcs used (in order of being chosen)

Tree

Total weight

M. •

- N

S.

• *P*

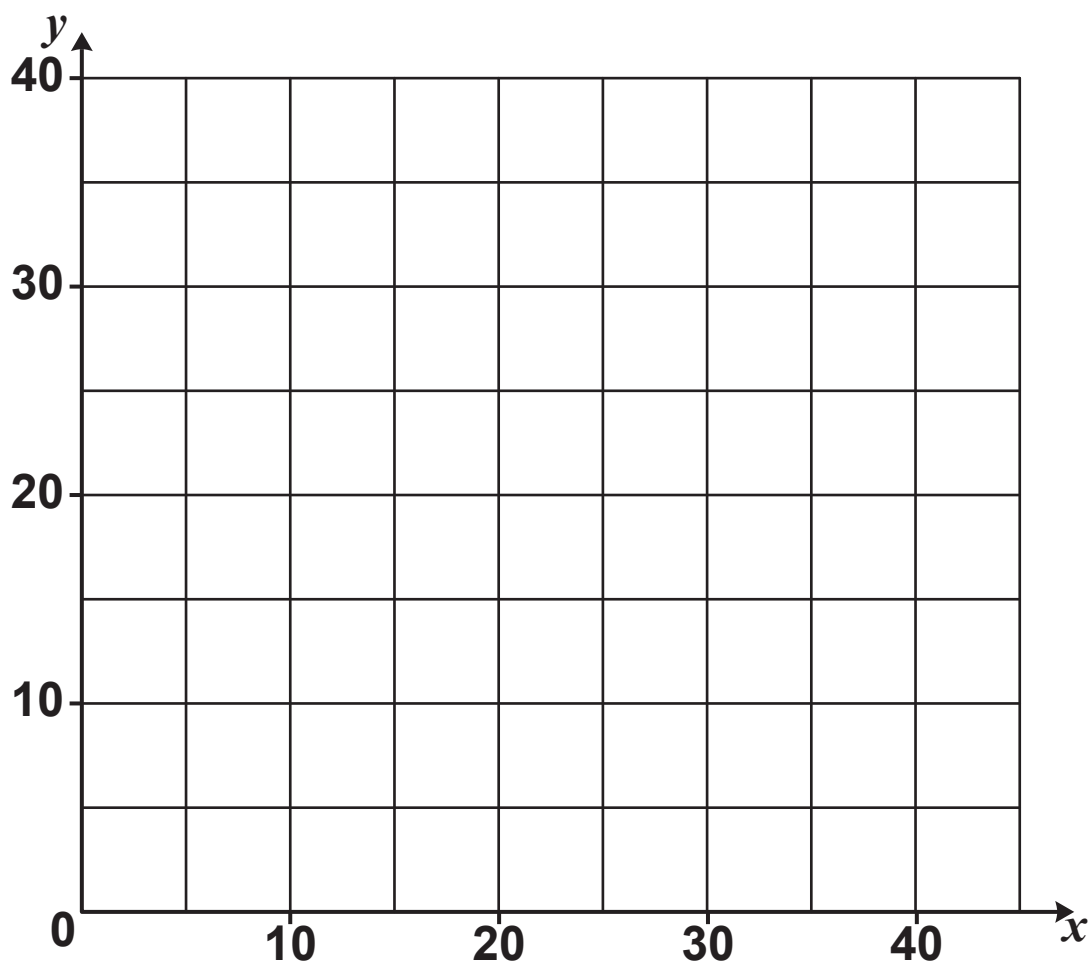
 \dot{R}

| | |
|----------------|----------------------|
| 4 (iii) | $x =$ |
| | |
| 4 (iv) | $x =$ |
| | |
| 4 (v) | |
| | |
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| | |
| | |
| 4 (vi) | |
| | |
| | |
| | |
| | Upper bound = |

| | |
|----------|---|
| 4 (vii) | <div data-bbox="426 248 504 295">$M \bullet$</div> <div data-bbox="798 248 863 295">$\bullet N$</div> <div data-bbox="301 483 368 530">$U \bullet$</div> <div data-bbox="917 483 975 530">$\bullet P$</div> <div data-bbox="440 719 504 766">$S \bullet$</div> <div data-bbox="798 719 858 766">$\bullet R$</div> |
| 4 (viii) | <div data-bbox="426 1064 504 1111">$M \bullet$</div> <div data-bbox="798 1064 863 1111">$\bullet N$</div> <div data-bbox="301 1299 368 1346">$U \bullet$</div> <div data-bbox="917 1299 975 1346">$\bullet P$</div> <div data-bbox="440 1534 504 1581">$S \bullet$</div> <div data-bbox="798 1534 858 1581">$\bullet R$</div> |

| | |
|---------------|--|
| 5 (i) | $3x + 4y \leq 120$ because |
| | |
| | |
| | |
| | |
| | |
| | Other constraints (apart from x and y being integers) |
| | |
| | |
| | |
| 5 (ii) | $P =$ |
| | |
| | |

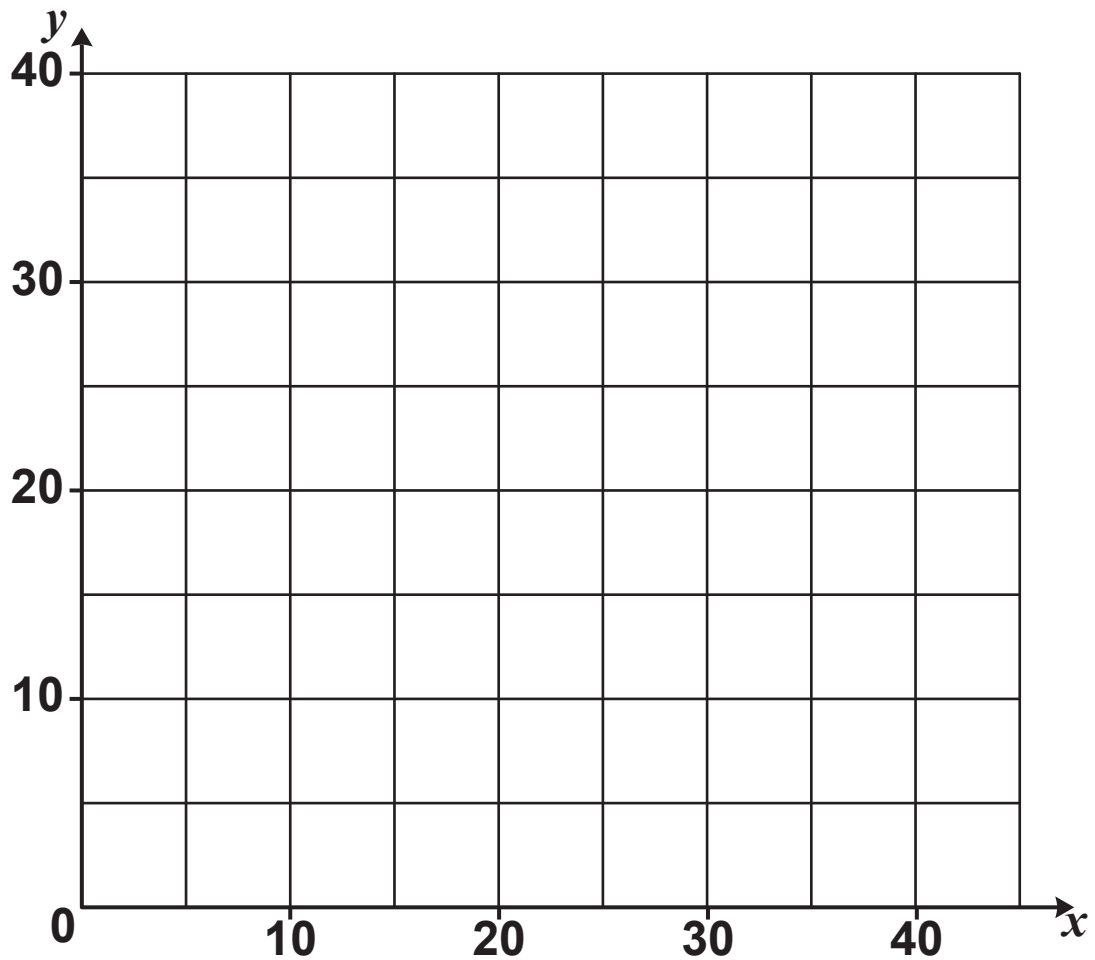
5 (iii) A spare copy of this diagram can be found on page 17.



(answer space continued on next page)

5 (iii) (continued)

Spare copy of the diagram for question 5(iii).



| | |
|---------------|---|
| 5 (iv) | |
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| | |
| | |
| | Small jars Large jars |
| 5 (v) | |
| | |
| | Profit £ |

6 (a)(i) Key:

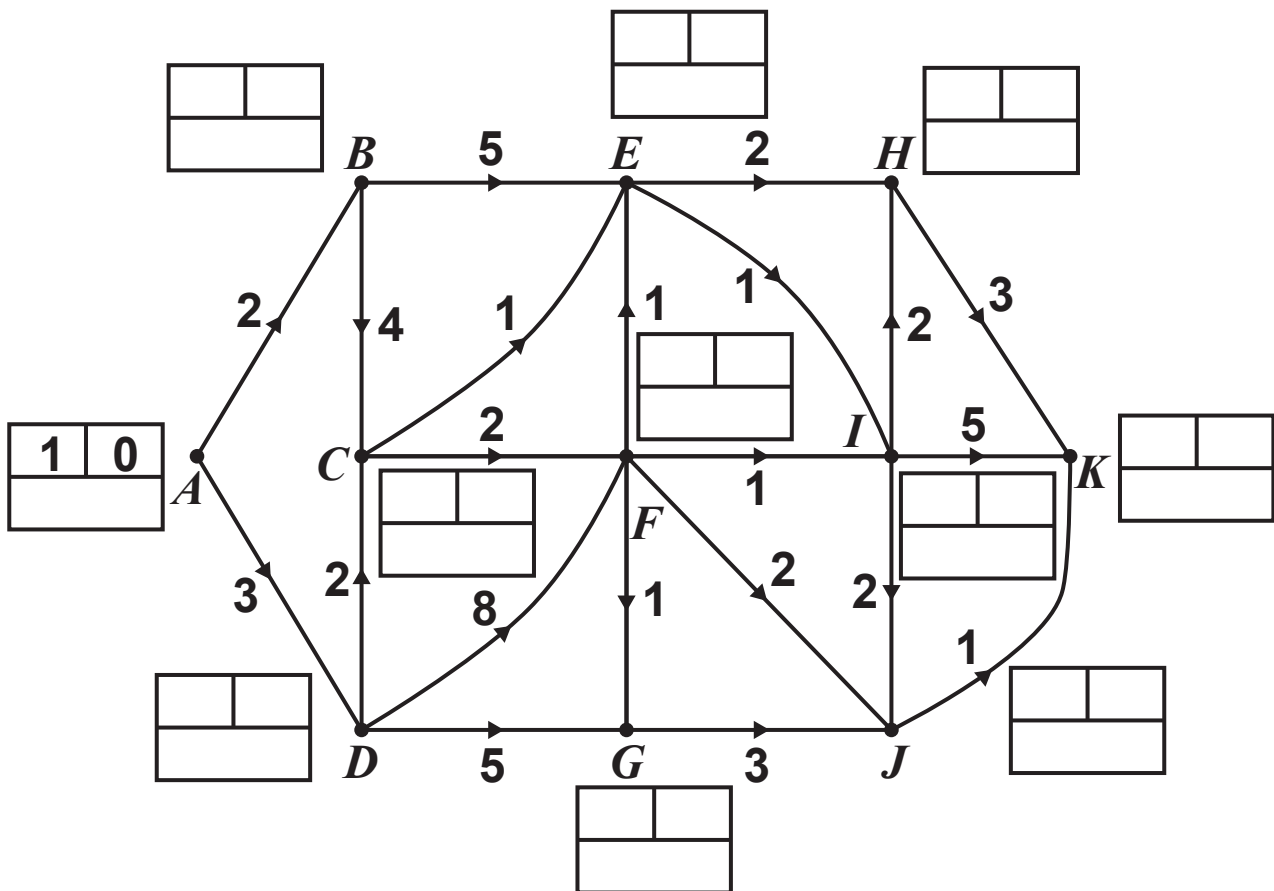
Order of becoming permanent



Permanent label

Temporary labels (working values)

Do not cross out your temporary labels.



Shortest distance: (in units of 100 m)

Route(s):

| | |
|------------------|---|
| 6 (a)(ii) | |
| | |
| | |
| | |
| | |
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| | |
| | Shortest distance: (in units of 100 m) |
| | Route(s): |
| | |

| | | |
|-----------------|--|----------------------------|
| 6 (b)(i) | | |
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| | | |
| | | |
| | Minimum distance = | (in units of 100 m) |
| | Arcs that represent repeated roads: | |
| | | |
| | | |

| | | |
|------------------|---|----------------------------|
| 6 (b)(ii) | | |
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| | | |
| | Minimum distance = | (in units of 100 m) |
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| | | |
| | Number of times through F = | |

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).

[illegible]

