Candidate surname

Other names

**Pearson Edexcel
Level 3 GCE**

Centre Number

Candidate Number

Time 1 hour 30 minutes

Paper
reference

9FM0/3D

Further Mathematics

**Advanced
PAPER 3D: Decision Mathematics 1**

Answer book
Do not return the question paper with the answer book.
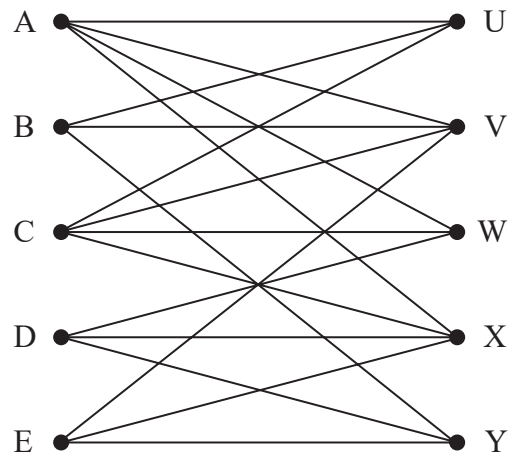
Total Marks

Turn over

Pearson

1.

Figure 1

Question 1 continued

(Total for Question 1 is 4 marks)

2.
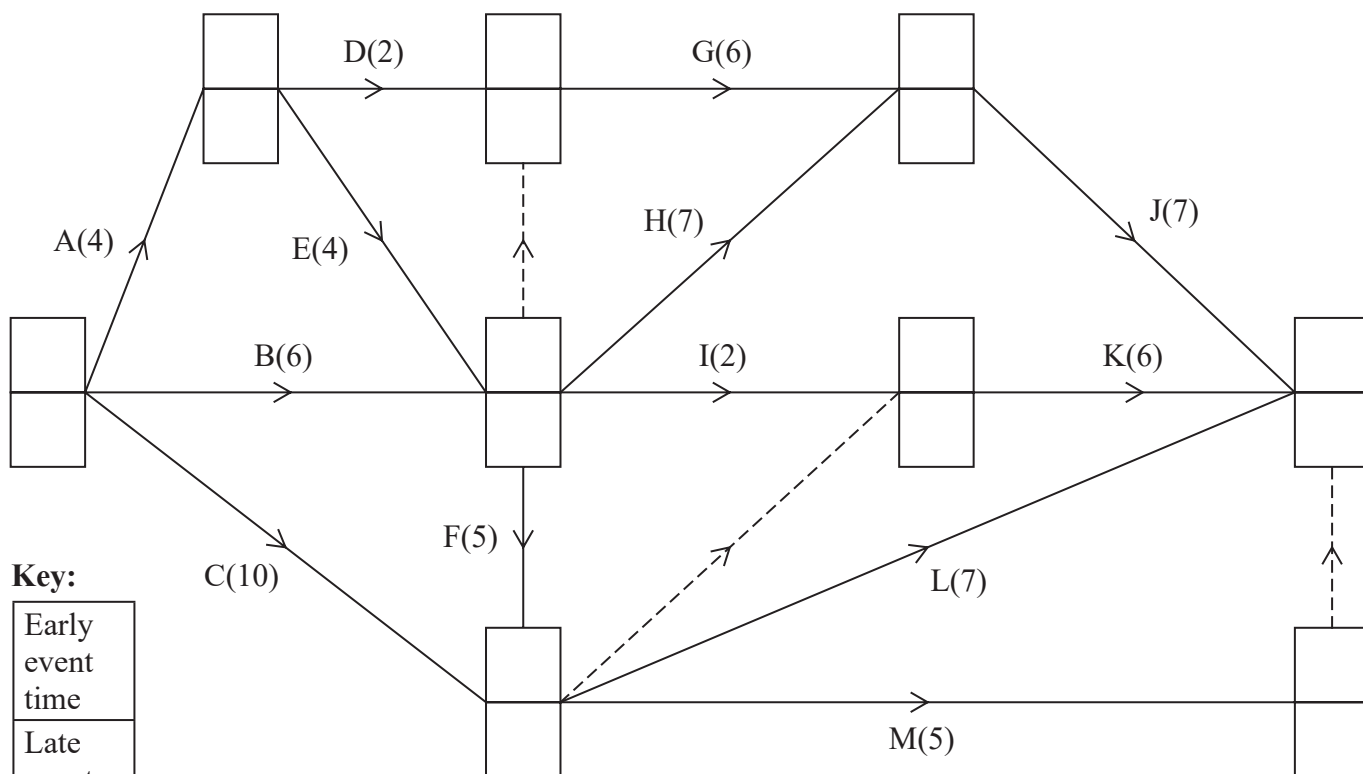
Diagram 1

P 6 6 8 0 1 A 0 4 2 0

Question 2 continued

| 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 |

Grid 1
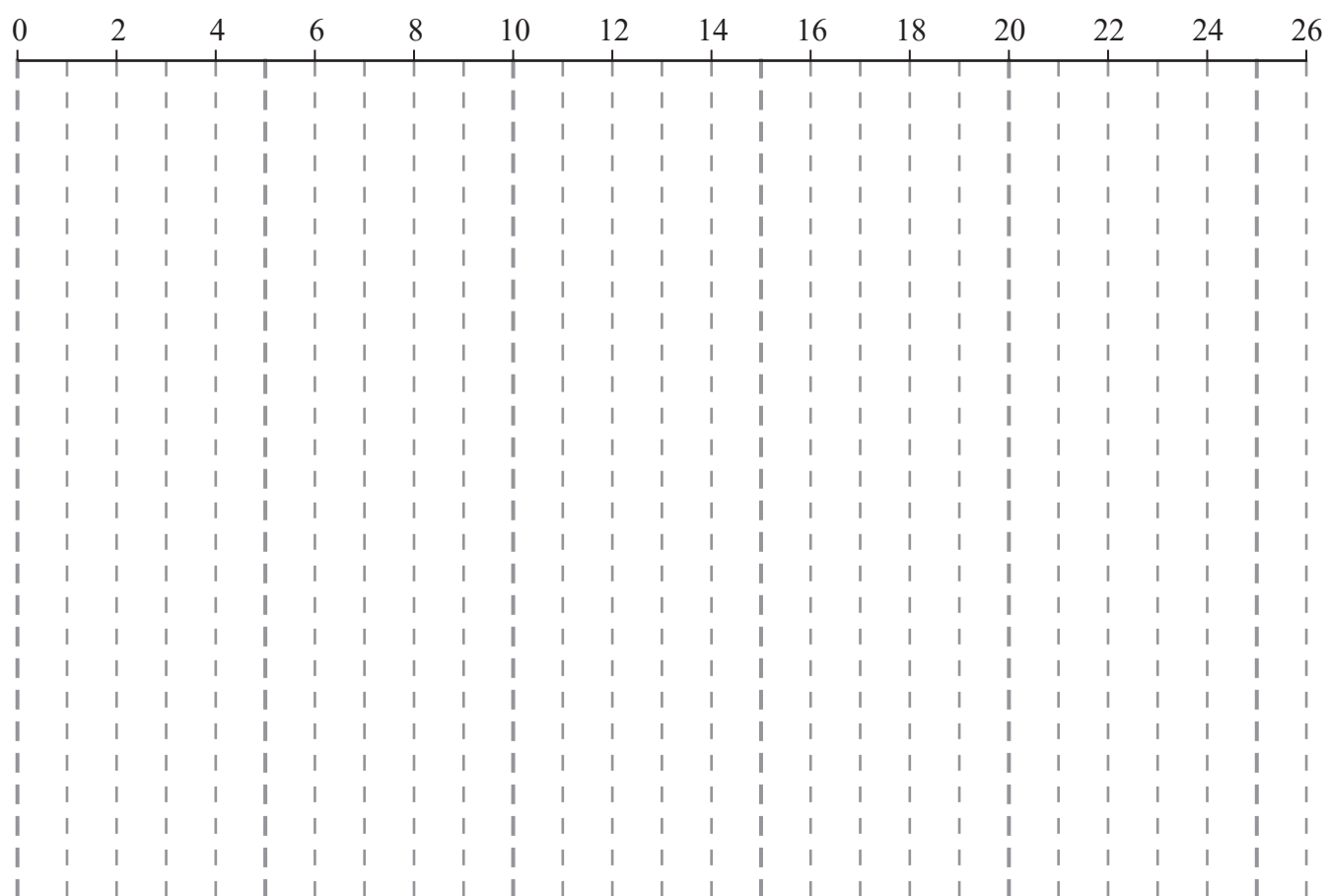
(Total for Question 2 is 9 marks)

3.

	A	B	C	D	E	F	G	H
A	–	24	42	48	34	37	32	22
B	24	–	40	35	30	41	39	44
C	42	40	–	21	26	45	38	36
D	48	35	21	–	32	37	29	27
E	34	30	26	32	–	34	40	28
F	37	41	45	37	34	–	43	41
G	32	39	38	29	40	43	–	38
H	22	44	36	27	28	41	38	–

Question 3 continued

	A	B	C	D	E	F	G	H
A	–	24	42	48	34	37	32	22
B	24	–	40	35	30	41	39	44
C	42	40	–	21	26	45	38	36
D	48	35	21	–	32	37	29	27
E	34	30	26	32	–	34	40	28
F	37	41	45	37	34	–	43	41
G	32	39	38	29	40	43	–	38
H	22	44	36	27	28	41	38	–

(Total for Question 3 is 8 marks)

4. (a)

Initial time matrix

	A	B	C	D	E	F
A						
B						
C						
D						
E						
F						

Initial route matrix

	A	B	C	D	E	F
A	A	B	C	D	E	F
B	A	B	C	D	E	F
C	A	B	C	D	E	F
D	A	B	C	D	E	F
E	A	B	C	D	E	F
F	A	B	C	D	E	F

(b) 1st iteration

Time matrix

	A	B	C	D	E	F
A						
B						
C						
D						
E						
F						

Route matrix

	A	B	C	D	E	F
A						
B						
C						
D						
E						
F						

(Total for Question 4 is 8 marks)

5.   30   12   5   2   23   18   36   10   15   24

(Total for Question 5 is 10 marks)

6.
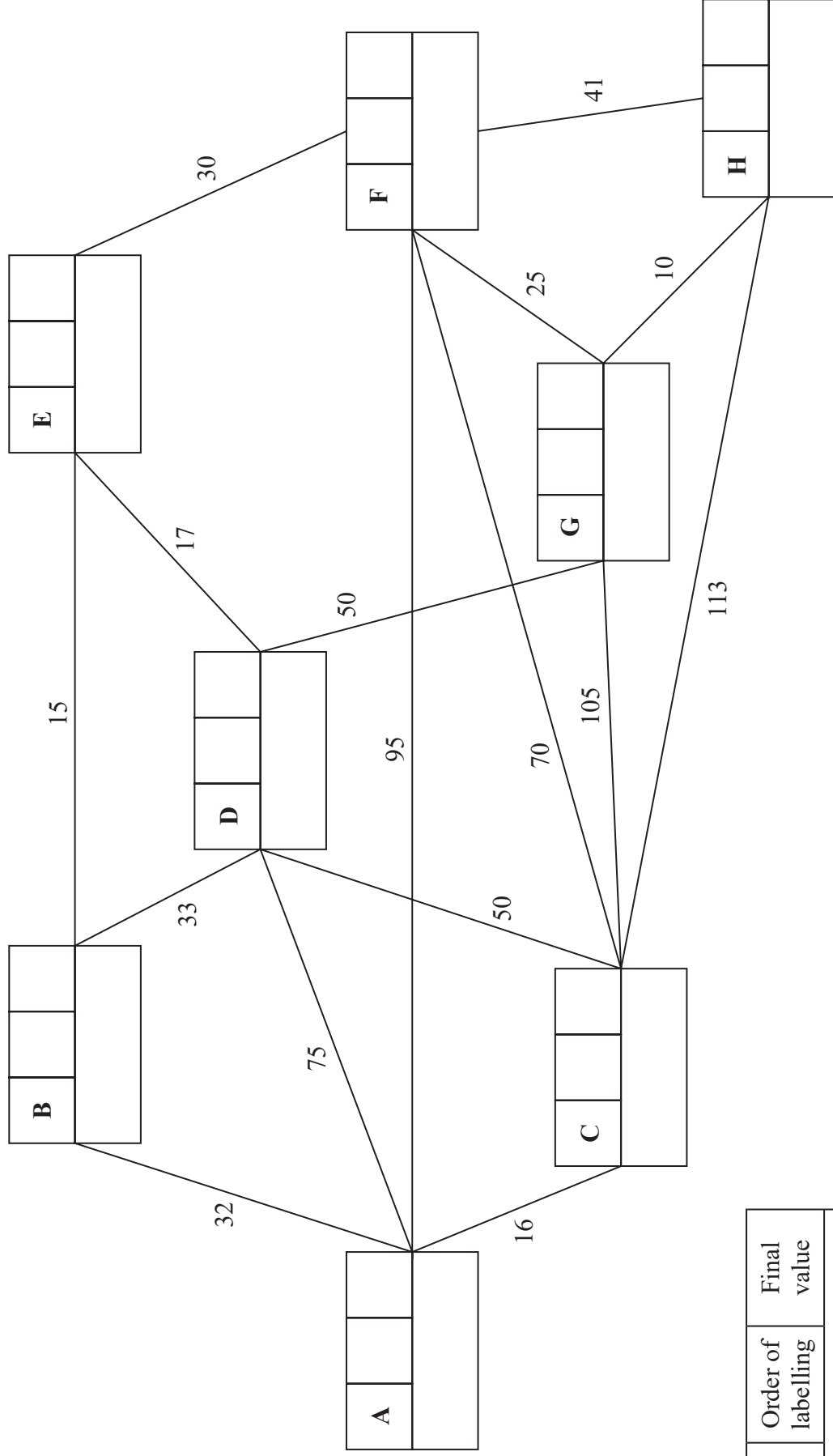
Key:

Vertex	Order of labelling	Final value
Working values		

Shortest path from A to H: _____

Length of shortest path from A to H: _____

Question 6 continued
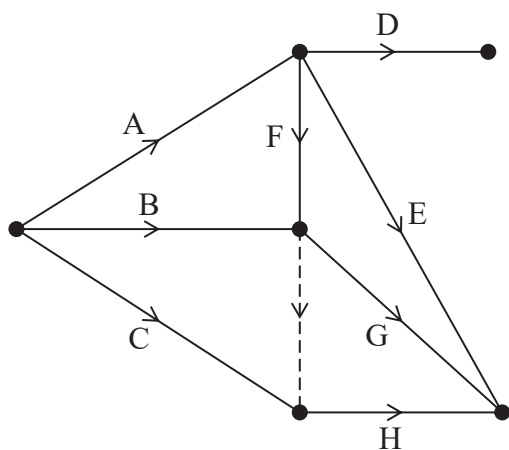
(Total for Question 6 is 10 marks)

Activity	Immediately preceding activities	Activity	Immediately preceding activities
A		E	
B		F	
C		G	
D		H	

(Total for Question 7 is 8 marks)

8.

Question 8 continued

b.v.	x	y	z	s_1	s_2	s_3	a_1	Value
P								
I								

P 6 6 8 0 1 A 0 1 8 2 0

b.v.	x	y	z	s_1	s_2	s_3	Value
y	0	1	0	1	0	1	11
s_2	0	0	5	−2	1	−5	62
x	1	0	1	0	0	−1	28
P	0	0	−1	1	0	1	11

b.v.	x	y	z	s_1	s_2	s_3	Value	Row Ops
P								

Spare copy

b.v.	x	y	z	s_1	s_2	s_3	Value	Row Ops
P								

(Total for Question 8 is 18 marks)

TOTAL FOR PAPER IS 75 MARKS

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