Version



Free-Standing Mathematics Qualification June 2012

Mathematics Advanced Level 6994

(Specification 6994)

Using and Applying Decision Mathematics

Final



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Key to mark scheme abbreviations

М	mark is for method
m or dM	mark is dependent on one or more M marks and is for method
А	mark is dependent on M or m marks and is for accuracy
В	mark is independent of M or m marks and is for method and accuracy
E	mark is for explanation
\sqrt{or} ft or F	follow through from previous incorrect result
CAO	correct answer only
CSO	correct solution only
AWFW	anything which falls within
AWRT	anything which rounds to
ACF	any correct form
AG	answer given
SC	special case
OE	or equivalent
A2,1	2 or 1 (or 0) accuracy marks
–x EE	deduct <i>x</i> marks for each error
NMS	no method shown
PI	possibly implied
SCA	substantially correct approach
С	candidate
sf	significant figure(s)
dp	decimal place(s)

No Method Shown

Where the question specifically requires a particular method to be used, we must usually see evidence of use of this method for any marks to be awarded.

Where the answer can be reasonably obtained without showing working and it is very unlikely that the correct answer can be obtained by using an incorrect method, we must award **full marks**. However, the obvious penalty to candidates showing no working is that incorrect answers, however close, earn **no marks**.

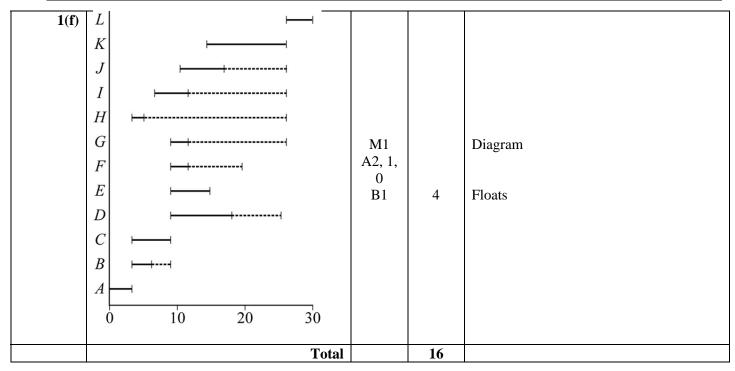
Where a question asks the candidate to state or write down a result, no method need be shown for full marks.

Where the permitted calculator has functions which reasonably allow the solution of the question directly, the correct answer without working earns **full marks**, unless it is given to less than the degree of accuracy accepted in the mark scheme, when it gains **no marks**.

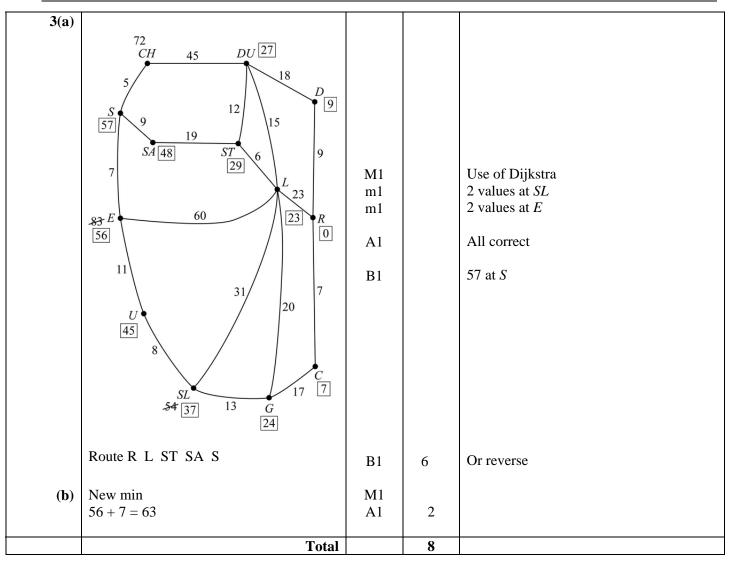
Otherwise we require evidence of a correct method for any marks to be awarded.

Free-Standing Mathematics Qualification Advanced Level – Using and Applying Decision Mathematics (6994) Answers and Marking Scheme - June 2012

Q	Solution	Marks	Total	Comments
1(a)		M1 A4, 3, 2, 1, 0	5	Network diagram, or activity on arc
(b)	A 0 3	M1 A1	2	Forward pass
(c)	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	M1 A1 A1	3	Backward pass Correct at least two of G, H, I, J and K All correct
(d)	A, C, E, K, L	B1	1	
(e)	53 HRS	B1	1	



2(a)	$W \rightarrow G \rightarrow F = 16$ 9 7	E1	1	
(b)(i)	FSGWORDF	M1 M1 A2, 1, 0		Tour Visits all places All correct, 1 slip
	= 168	B1	5	
(ii)	FSGWORWDSF	M1 A1	2	Any 'expansion' All correct, 1 slip
(iii)	SFGWORDS	M1 A2, 1, 0		Tour or visits all places then as (i)
	= 161	B1	4	
(c)(i)	F G = 7	M1		Prims – on matrix
	G W = 9			
	F D = 17	A1		FD 3 rd
	O W = 21	A1		OW 4 th
	W R = 39	B1		All correct
	= 93	B1	5	
(ii)	93 + 5 + 9 (93 + SF + SG)	M1		Their MST + 2 edges from S
	= 107	A1F B1	3	Their 93 + 14
(d)	$134 < T \le 161$	B1F		Either correct
		B1F B1	3	All correct, written as interval SC1 134, 161 written scores 1/3
	Total		23	



4(a)	ODDS K, C, O, W KC + OW = 800 + 800 = 1600 KW + OC = 800 + 810 = 1610 KO + CW = 800 + 810 = 1610 3240 + 1600 = 4840	E1 M1 A2, 1, 0 m1 A1	6	These 3 pairs of odds 3240 + 'their' min CSO
(b)(i)	M – 3	B1	1	
(ii)	R – 3	B1	1	
(c)(i)	3240 + 800 = 4040	M1 A1 A1	3	3240 + 'their' min Using 800
(ii)	Any correct pair e.g. O/C C/W K/C O/W	B2	2	B1 wrong combination of odds
	Total		13	
	TOTAL MARK FOR PAPER		60	