

## **Marking Notes**

### **Question #1 ( 30 marks)**

Most students should receive 25/25 for the model and 5/5 just for printing the formula worksheet. The most likely deduction on the model page, if one occurs, would be that they forget to set the "2" in cell D19 as input data (so that it is available for linking to cells F22:26).

The most efficient way to mark this is to check the target cell first; if it is \$1728, chances are their model is very good.

Please note that they may set up their model that looks different from mine. There should be no deduction if their model is logical, well organized and easy to understand. I have included an example of a different looking but good model for question 1.

### **Question 2, 3 and 4**

Bolded & red font information (or equivalent) must be included to receive marks.

Where two things are bolded and 2 marks are allocated, each bolded part will be worth 1 mark.

Where two things are bolded and only 1 mark is assigned ( part (e) for example), both bolded items must be included to receive the one mark.

### **Question 4 part a**

no deduction if they leave out the ?? in the tree

**Question 1 (Larry Edison)**

**Input Data**

		Time periods covered by different shift workers				# Employees
		8:00 - Noon	Noon - 4:00pm	4:00 - 8:00pm	8:00 to Mid	
<b>Shift Starting at</b>	8:00 AM Full-Time	4	4			4
	12 Noon Full-Time		2	2		2
	4:00 PM Full-Time			6	6	6
	8:00 AM Part-Time	2				2
	12 Noon Part-Time		2			2
	4:00 PM Part-Time			4		4
	8:00 PM Part-Time				0	0
		Shift1	Shift2	Shift3	Shift4	
Supply		6	8	12	6	
Demand		6	8	12	6	

5 marks

3 marks

**Additional Constraints**

Minimum # FT needed for each PT **2**

2 marks

	Full-Time		Part-Time
Shift1	4	>=	4
Shift2	6	>=	4
Shift3	8	>=	8
Shift4	6	>=	0

5 marks

**Cost Information**

	Rate/hr	Hours/shift		
Cost FT	\$ 14.00	8	Total Cost Full-Time	\$ 1,344.00
Cost PT	\$ 12.00	4	Total Cost Part-Time	384.00
			Total Cost	<b>\$ 1,728.00</b>

5 marks

**Summary:**  
 4 FT starting at 8:00 am  
 2 FT starting at 12 noon  
 6 FT starting at 4:00 pm  
 and  
 2 PT starting at 8:00 am  
 2 PT starting at 12 noon  
 4 PT starting at 4:00 pm  
 0 PT starting at 8:00 pm  
  
 Total Cost of Staffing Plan: **\$ 1,728**

5 marks

*Note to markers:*  
 This problem has multiple optima so students may get different (but correct) numbers for the changing cells. However, their target cell must still be \$1728

	A	B	C	D	E	F	G	H	I	J
1	Question 1 (La									
2	Time periods covered by different shift workers									
3	Input Data		8:00 - Noon	Noon - 4:00pm	4:00 - 8:00pm	8:00 to Mid		# Employees		
4										
5	0.33333333	Full-Time	=H5	=H5					4	
6	12 Noon	Full-Time		=H6	=H6				2	
7	0.66666666	Full-Time			=H7	=H7			6	
8	Shift Starting at									
9	0.33333333	Part-Time	=H8						2	
10	12 Noon	Part-Time		=H9					2	
11	0.66666666	Part-Time			=H10				4	
12	0.83333333	Part-Time				=H11			0	
13			Shift1	Shift2	Shift3	Shift4				
14	Supply		=D5+D8	=E5+E6+E9	=F6+F7+F10	=G7+G11				
15	Demand		>=	>=	>=	>=				
16			6	8	12	6				
17	Additional Cor									
18										
19	Minimum # F		2							
20										
21		Full-Time		Part-Time						
22	Shift1	=D5	>=	=D\$19*D8						
23	Shift2	=E5+E6	>=	=D\$19*E9						
24	Shift3	=F6+F7	>=	=D\$19*F10						
25	Shift4	=G7	>=	=D19*G11						
26										
27	Cost Informati									
28		Rate/hr	Hours/shift							
29	Cost FT	14	8			Total Cost Full-Tir		=C29*D29*SUM(H5:H7)		
30	Cost PT	12	4			Total Cost Part-Ti		=C30*D30*SUM(H8:H11)		
31						Total Cost		=SUM(H29:H30)		
32										
33										
34	Summary:									
35	4 FT starting at 8:00 am									
36	2 FT starting at 12 noon									
37	6 FT starting at 4:00 pm									
38	and									
39	2 PT starting at 8:00 am									
40	2 PT starting at 12 noon									
41	4 PT starting at 4:00 pm									
42	0 PT starting at 8:00 pm									
43	Total Cost of Staffing Plan: \$ 1,728									
44										
45										
46										
47										
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49										
50										
51										
52										
53										

Marking Guide:

This sheet is worth 5 marks just for printing and including with this homework.

- 0 if they print in landscape
- 1 if they do not include row and column headings.(Note: without these, the formulas will make no sense).
- 1 if they cut off the formulas so you cannot read them in full

**Question 1 (Larry Edison)**

**Input Data**

		Time periods covered by different shift workers				# Employees
		8:00 - Noon	Noon - 4:00pm	4:00 - 8:00pm	8:00 to Mid	
<b>Shift</b>	8:00 AM Full-Time	4	4			4
	12 Noon Full-Time		2	2		2
	4:00 PM Full-Time			6	6	6
<b>Starting at</b>	8:00 AM Part-Time	2				2
	12 Noon Part-Time		2			2
	4:00 PM Part-Time			4		4
	8:00 PM Part-Time				0	0
		Shift1	Shift2	Shift3	Shift4	
Supply		6	8	12	6	
		>=	>=	>=	>=	
Demand		6	8	12	6	

This alternate model is also good; no deduction.  
  
Essentially they have split up the changing cells into two groups.

**Additional Constraints**

Minimum # FT needed for each PT **2**

	Full-Time		Part-Time
Shift1	4	>=	4
Shift2	6	>=	4
Shift3	8	>=	8
Shift4	6	>=	0

**Cost Information**

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**Summary:**  
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*Note to markers:*  
  
 This problem has multiple optima so students may get different (but correct) numbers for the changing cells. However, their target cell must still be \$1728

**Question 2**

- (a) P (explore) = **1790 / 2385** or 0.7505 } 1 mark
- (b) P (Purchase) = **387/2385** or 0.1623 } 1 mark
- (c) P (Purchase | Explore) = **387 / 1790** or 0.2162 } 1 mark
- (d) **Part (a)** } 2 marks

**Question 3**

P ( college or training or both) = P ( college or training)

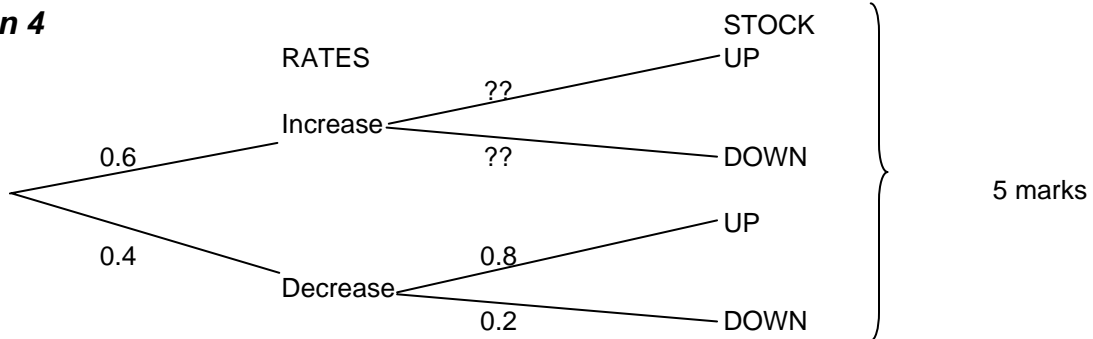
= **P (college) + P(training) - P (college and training)** } 2 marks

= **380/550 + 412/550 - 357/550** } 2 marks

= **435/550** or **0.7909** } 1 mark

**Question 4**

a)



b)

P ( StockUP and Decrease) = P (Decrease and StockUP)

**P (Decrease and StockUP)** } 1 mark

**= P(Decrease) x P( StockUP | Decrease)** } 1 mark

**= 0.40 x 0.8 = 0.32** } 1 mark

c)

Want P ( UP) = P (UP and increase or Up and decrease)

**Can't tell with the information provided.** } 2 marks

**We would need P (UP | increase) which we don't have.** } for any one

**or** } of these

**at least 0.32** } answers

**or**

**between 0.32 and 0.92**

*Note; The best answer is 0.32 - 0.92 because it provides the most information.*