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SCM 301 (Lutz) – Exam 4 – Practice Exam Solutions

1. **A –** 6

   Calculate projected ending inventory – Use the equation below:

$$EI_t = EI_{t-1} + MPS_t - \max(F_t, OB_t)$$

   Projected EI = EI, last period + MPS quantity – Forecasted demand/booked orders (whichever is bigger)

   EI Week 2 = 26 + 60 – max(18, 6) = 68
   EI Week 3 = 68 + 0 – max(20,40) = 28
   EI Week 4 = 28 + 0 – max(22,19) = 6
   EI Week 5 = 6 + 80 –max(24,10) = 62
   EI Week 6 = 62 + 0 – max(26,29) = 33
   EI Week 7 = 33 + 0 – max(28,9) = 5
   EI Week 8 = 5 + 60 – max(30,27) = 35
   EI Week 9 = 35 + 0 – max(32,4) = 3

2. **C –** 32

   Calculate available to promise (ATP) for 1st week of master schedule record – Use the equation below

$$ATP_t = EI_{t-1} + MPS_t - \sum_{i=t}^{z-1} OB_i$$

   ATP = EI, last period + MPS quantity – Sum, all orders booked from now until next positive MPS quantity

   ATP Week 2 = 26 + 60 – (6 + 40 + 19) = 21
   ATP Week 5 = 80 – (10 + 29 + 9) = 32
   ATP Week 9 = 60 – 27 – 4 = 29

3. **D –** All of the above

EI week 19 = 275 + 560 – 210 = 625
EI week 20 = 625 + 0 – 289 = 336
EI week 21 = 336 + 0 – 280 = 56
EI week 22 = 56 + 1,035 – 140 = 951
EI week 23 = 951 + 0 – 219 = 732
EI week 24 = 732 + 0 – 127 = 605
EI week 25 = 605 + 730 – 145 = 1,190
EI week 26 = 1,190 + 0 – 294 = 896
Conclude that answer choice A is correct

ATP week 25 = 730 – (132 + 294) = 304
Conclude that answer choice B is correct

(625 + 336 + 56 + 951 + 732 + 605 + 1,190 + 896) / 8 periods = 673.875 = 674
Conclude that answer choice C is correct

4. **F –** A and C

On-hand inventory at end of April: 275								
Month	**May**				**June**			
Week	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**
Forecasted demand	210	135	280	140	125	125	145	275
Booked orders	129	289	273	117	219	127	132	294
Projected ending inventory	625	336	56	951	732	605	1,190	896
Master production schedule	560	0	0	1,035	0	0	730	0
Available to promise	144			572			304	

a) **True –** The cancellation did not occur until week 25; therefore, the ATP for previous weeks will definitely be unaffected
b) **False –** We will still used forecasted demand instead of booked orders when calculating ending inventory for week 25 since we always use whichever is bigger; therefore, the projected EI for week 25 will be unaffected
c) **True –** New ATP week 25 = 730 – [(132-85) + 294]
New ATP week 25 = 730 – (47 + 294) = 730 – 341 = 389
New ATP – Old ATP = 389 – 304 = 85

5. **C –** Available to promise (ATP)

6. **B –** False

7. **B –** Forecast demand always exceeds booked orders

8. **D –** Master scheduling

9. **A –** True

10. **B –** False

11. **A –** It suggests that more production may be needed if the sales forecasts are accurate

12. **E –** It means that the available inventory is over-sold. Additional units should be manufactured or purchased.

13. **A –** A booked order

14. **B –** The term just-in-time (JIT) production is used interchangeable with the term Lean production

15. **C –** Planning lead time

Use the Following Work for the Answers to the Next Two Problems

Week		**1**	**2**	**3**	**4**	**5**	**6**
A2	Gross requirements	0	550	550	300	400	450
LT (weeks) = 1	Scheduled receipts						
	Projected ending inventory: 100	100	0	0	0	0	0
	Net requirements	0	450	550	300	400	450
Min. order = 200	Planned receipts	0	450	550	300	400	450
	Planned orders	450	550	300	400	450	0

*Cells highlighted in yellow indicate that this information was given as part of the problem

16. **C –** 17

    Average ending inventory = 100 / 6 = 16.67 = 17

17. **B –** Week 2

18. **E –** All of the above

Item			1	2	3	4	5
A	Gross Req		200	200	200	300	300
	Sched Req			200			
	Proj Avail	260	60	60	0	0	0
	Net Req		0	0	140	300	300
	Planned Rec		0	0	140	300	300
	Planned Rel		140	300	300		

19. **B –** C-D-B-E-A

    CR A = 14/4 = 3.5
    CR B = 32/16 = 2
    CR C = 8/8 = 1
    CR D = 34/20 = 1.7
    CR E = 30/10 = 3

    When using the critical ratio (CR) sequence, we always start with the job with the lowest critical ratio (CR) and continue on until we end up doing the job with the highest critical ratio (CR) last

20. **E –** C and D

21. **A –** Materials requirements planning (MRP) is performed at a greater level of detail than master scheduling

22. **D –** Materials requirements planning (MRP)

23. **A –** Exploding the bill-of-materials (BOM)

24. **D –** All of the above

25. **D –** Why should we produce what we're producing?

26. **B –** Bill-of-materials (BOM)

27. **C –** Increasing the number of levels in a product structure tree will cause an MRP system to become less nervous

28. **A –** True

29. **A –** True

30. **D –** A high minimum order quantity may result in having to hold and manage inventory and incur additional inventory holding costs

31. **C –** 12,000 units

    Make
    $Total\ Cost = 410x + 120{,}000$

    Buy
    $Total\ cost = 420\ x$

    Breakeven Quantity
    $420x = 410x + 120{,}000$
    $10x = 120{,}000$
    $x = 12{,}000$

    You can double check your work by plugging 12,000 for x into both equations. You will find that you get a total cost of $5,040,000 for both options (make and buy) when $x = 12{,}000$.

32. **B –** Buy

    Since D < Q, they should <u>buy</u> the part.

    You can double check this by calculating the total cost for both options using $x = 11{,}000$. You will see that it it is cheaper to buy 11,000 units than it is to make 11,000 units.

    <u>Make</u>
    $Total\ Cost = 410x + 120{,}000$
    $Total\ Cost\ for\ 11k = 410(11{,}000) + 120{,}000$
    $Total\ Cost\ for\ 11k = 4{,}510{,}000 + 120{,}000 = 4{,}630{,}000$

    <u>Buy</u>
    $Total\ cost = 420\ x$
    $Total\ cost\ for\ 11k = 420(11{,}000) = 4{,}620{,}000$

33. **C –** The profit leverage effect

34. **C –** Outsourcing

35. **D –** Total cost analysis

36. **B –** Supply management

37. **A –** True

38. **C –** 25%

$$Return\ on\ Assets\ (ROA) = \frac{Net\ Income}{Total\ Assets} = \frac{500{,}000}{2{,}000{,}000} = 0.25 = 25\%$$

39. **B –** 5%

$$Profit\ Margin\ (PM) = \frac{Net\ Income}{Sales} = \frac{500{,}000}{10{,}000{,}000} = 0.05 = 5\%$$

40. **D –** $ 20

This question is asking us to calculate the profit leverage effect. A profit leverage effect of $20 means that cutting costs by $1 will have the same effect on this company's bottom line (net income) as increasing the top line (sales) by $20.

$$P.L.E = \frac{\$1}{PM\ (expressed\ as\ a\ decimal)} = \frac{\$1}{0.05} = \$20$$

41. **D –** 38%

$$COGS\ reduction = 5{,}000{,}000(0.05) = 250{,}000$$
$$New\ Pretax\ Earnings = 500{,}000 + 250{,}000 = 750{,}000$$
$$New\ Return\ on\ Assets\ (ROA) = \frac{Net\ Income}{Total\ Assets} = \frac{750{,}000}{2{,}000{,}000} = 0.375 = 38\%$$

42. **B –** 7.5%

$$COGS\ reduction = 5{,}000{,}000(0.05) = 250{,}000$$
$$New\ Pretax\ Earnings = 500{,}000 + 250{,}000 = 750{,}000$$
$$New\ Profit\ Margin\ (PM) = \frac{Net\ Income}{Sales} = \frac{750{,}000}{10{,}000{,}000} = 0.075 = 7.5\%$$

43. **D –** Critical/strategic

44. **C –** Bottleneck/problems

45. **B –** Leverage/commodities

46. **A –** Routine/generic

47. **A –** Cost-based and price-based

48. **D –** Total cost analysis

49. **C –** Dual sourcing

50. **A –** True

51. **A –** True

52. **A –** AmeriCann

    We know that the sum of all weights must add up to 1.0 or 100%. Therefore, the weight assigned to fluffiness must be 0.1 (1 – 0.5 – 0.2 – 0.2 = 0.1).

    Weighted score AmeriCann = (0.5*5) + (0.2*4) + (0.2 *2) + (0.1*3)
    Weighted score AmeriCann = 2.5 + 0.8 + 0.4 + 0.3 = 4

    Weighted score Cannagrow Holdings = (0.5*4) + (0.2*3) + (0.2 *1) + (0.1*5)
    Weighted score Cannagrow Holdings = 2 + 0.6 + 0.2 + 0.5 = 3.3

    Weighted score Sativa Co = (0.5*2) + (0.2*5) + (0.2 *4) + (0.1*5)
    Weighted score Sativa Co = 1.0 + 1.0 + 0.8 + 0.5 = 3.3

53. **D –** All of the above

54. **D –** Cross sourcing

55. **C –** Outsourcing allows companies to have access to high levels of products and technology without a high level of investment

56. **B –** Portfolio analysis begins with assignment to a quadrant before a sourcing strategy is formulated

57. **B –** Direct; indirect

58. **B –** Routine (generics) quadrant

59. **C –** Cost-based contract

60. **A –** Purchase order

61. **D –** Often need to develop a more detailed picture, or profile, of the internal needs of the organization as well as the characteristics of the external supply base

62. **A –** True

63. **C –** Preferred suppliers

64. **B –** False

The weighted-point evaluation method is <u>not</u> totally objective. This is because the user of the model sets the weights based on what they value as most important.

<u>Use the Following Work for the Next Four Problems</u>

<u>Supplier 1</u>
Cost per unit = $260 + $9 + ($1,100 / 3,600 units)
Cost per unit = $260 + $9 + $0.31 = $269.31 per unit
Cost per month = [($260 + $9)*3,600] + $1,100 = $969,500

<u>Supplier 2</u>
Cost per unit = $150 + $5 + [($7,600 + $1,100) / 3,600 units)
Cost per unit = $150 + $5 + $2.42 = $157.42 per unit
Cost per month = [($150 + $5)*3,600] + $7,600 + $1,100 = $566,700

<u>Supplier 3</u>
Cost per unit = $196 + $9 + [($9,600 + $1,500) / 3,600 units)
Cost per unit = $196 + $9 + $3.08 = $208.08 per unit
Cost per month = [($196 + $9)*3,600] + $9,600 + $1,500 = $749,100

65. **A –** Supplier 1

66. **B –** Supplier 2

67. **B –** $208.10 per unit

68. **B –** $566,700 per month

69. **B –** Near (4,5)

$$Total\ demand = 25 + 13 + 6 + 4 = 48$$

$$X* = \frac{(3*25) + (5*13) + (8*6) + (1*4)}{48} = \frac{75 + 65 + 48 + 4}{48} = \frac{192}{48} = 4$$

$$Y* = \frac{(7*25) + (2*13) + (4*6) + (5*4)}{48} = \frac{175 + 26 + 25 + 20}{48} = \frac{246}{48}$$
$$= 5.125$$

70. **C –** (175,275)

Total demand = 500 + 30 = 800

$$X* = \frac{(100*500) + (300*300)}{800} = \frac{50{,}000 + 90{,}000}{800} = \frac{140{,}000}{800} = 175$$

$$Y* = \frac{(200*500) + (400*300)}{800} = \frac{100{,}000 + 120{,}000}{800} = \frac{220{,}000}{800} = 275$$

71. **C –** 92.5%

$$\%\ \boldsymbol{of\ Perfect\ Orders} = \mathbf{100\%}\left(\frac{\boldsymbol{Total\ orders - Orders\ with\ \geq 1\ defect}}{\boldsymbol{Total\ orders}}\right)$$

$$\%\ of\ Perfect\ Orders = 100\%\left(\frac{2{,}000{,}000 - 150{,}000}{2{,}000{,}000}\right) = 100\%\left(\frac{1{,}850{,}000}{2{,}000{,}000}\right)$$
$$= 100\%(0.925) = 92.5\%$$

72. **A –** 91.2%

$$\%\ Perfect\ Order = 0.98 \times 0.99 \times 0.94 \times 1.00 = 0.912$$

$$0.912 \times 100 = 91.2\%$$

73. **B –** Increase customer lead times

74. **E –** Logistics management

75. **C –** Highway

76. **B –** Water

77. **A –** Air

78. **B –** Water

79. **D –** Rail

80. **D –** Sustainability

81. **C –** Motor carriers have the best overall service level of all the transportation modes

82. **D –** Increase sales

83. **A –** Air carrier

84. **A –** Consolidation warehousing

85. **B –** Cross-docking

86. **E –** Warehousing

87. **C –** Postponement warehousing

88. **A –** True

89. **D –** Break-bulk warehousing

90. **B –** A hub-and-spoke system

91. **A –** Common carrier

92. **C –** Spot stock warehousing

93. **A –** Air transportation with a spot stock warehouse

94. **C –** Inspection

95. **C –** A freight forwarder

96. **D –** Reverse logistics

97. **B –** False

98. **D –** All of the above

99. **C –** Rail

100. **A –** True

101. **A –** Direct truck shipment

102. **C –** $230

103. **A –** True

104. **A –** Postponement warehousing

105. **C –** 38,147 orders

$$\%\ \boldsymbol{of\ Perfect\ Orders} = \mathbf{100}\%\left(\frac{\boldsymbol{Total\ orders - Orders\ with\ \geq 1\ defect}}{\boldsymbol{Total\ orders}}\right)$$

Since we do not know the amount of total orders, let's make total orders our x moving forward.

$$0.87 = \left(\frac{x - 5{,}700}{x}\right)$$

$$0.87x = x - 5{,}700$$
$$x - 0.87x = 5{,}700$$
$$x(1 - 0.87) = 5{,}700$$
$$x(0.13) = 5{,}700$$
$$x = \frac{5{,}700}{0.13} = 43{,}846.15 = 43{,}847$$

We now know that the total number of orders was 43,847. **However,** the question asked us how many orders were properly handled. Therefore, the number of orders that were properly handled will be the total number of orders minus the total number of orders with one or more defect.

$$Orders\ properly\ handled = 43{,}847 - 5{,}700 = 38{,}147$$