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SCM 301 (Solo) – 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. **B –** 26

$$y = \frac{DT(1+x)}{C}$$

$$y = \frac{(1{,}500)(45/60)(1.15)}{50} = \frac{1{,}293.75}{50} = 25.875 = 26$$

32. **D –** All of the above

33. **A –** True

34. **A –** The firm's supply chain will be more vulnerable to supply disruptions

35. **A –** True

36. **C –** The end customers

37. **E –** B and C

38. **D –** Increase in product quality

39. **C –** Waiting

40. **C –** Lean supply chain management

41. **D –** In a single-card Kanban system, the single card is the production card

42. **A –** Move card; production card

43. **A –** A pull system is a production system in which actual downstream demand sets off a chain of events that pull materials through the various steps of the production process

44. **A –** True

45. **C –** Demand responsive

46. **C –** 100

$$\boldsymbol{y = \frac{DT(1 + x)}{C}}$$

$$y = \frac{(160)(48)(1.30)}{100} = \frac{9{,}984}{100} = 99.84 = 100$$

47. **D –** Defects

48. **D –** Unnecessary inventory

49. **A –** Air

50. **A –** True

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

52. **A –** Waste

53. **A –** True

54. **D –** Increasing inventory

55. **A –** True

56. **A –** True

Use the Following Work for the Next Four Problems

Supplier 1

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

Supplier 2

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

Supplier 3

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

57. **A –** Supplier 1

58. **B –** Supplier 2

59. **B –** $208.10 per unit

60. **B –** $566,700 per month

61. **B –** Near (4,5)

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

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

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

62. **C –** (175, 275)

Total demand = 500 + 30 = 800

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

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

63. **C –** 92.5%

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

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

64. **A –** 91.2%

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

$0.912 \times 100 = 91.2\%$

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

66. **E –** Logistics management

67. **C –** Highway

68. **B –** Water

69. **A –** Air

70. **B –** Water

71. **D –** Rail

72. **D –** Sustainability

73. **C –** Motor carriers have the best overall service levels of all of the transportation modes

74. **D –** Increase sales

75. **A –** Air carrier

76. **A –** Consolidation warehousing

77. **B –** Cross-docking

78. **E –** Warehousing

79. **C –** Postponement warehousing

80. **A –** True

81. **D –** Break-bulk warehousing

82. **B –** A hub-and-spoke system

83. **A –** Common carrier

84. **C –** Spot-stock warehousing

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

86. **B –** Flexibility

87. **D –** Execution and transaction processing

88. **A –** Customer relationship management (CRM) activities

89. **D –** Decision support systems (DSS)

90. **A –** They can be very expensive to implement and maintain

91. **A –** True

92. **C –** Internal supply chain management

93. **B –** Cloud computing