ERRATA for

PE Industrial and Systems Practice Exam

ISBN 978-1-947801-05-9

Errata posted 05-01-2023

Revisions are shown in red.

Question 8, p. 10

Consider the following equation:

$$Y = 5 \times \frac{C_1}{C_2} - 3 \times \frac{C_3}{C_4}$$

Subject to the following constraints:

$$6 \le C_1 \le 12$$
$$15 \le C_2 \le 20$$
$$1 \le C_3 \le 4$$
$$-12 \le C_4 \le -3$$

Match the values on the right to their corresponding variables on the left so that the value of Y is maximized:

C_1			
C_2		–12	6
		–3	8
C_3		1.5	10
		1	12
C_4		4	15
		4.25	22
		5	40
Y			

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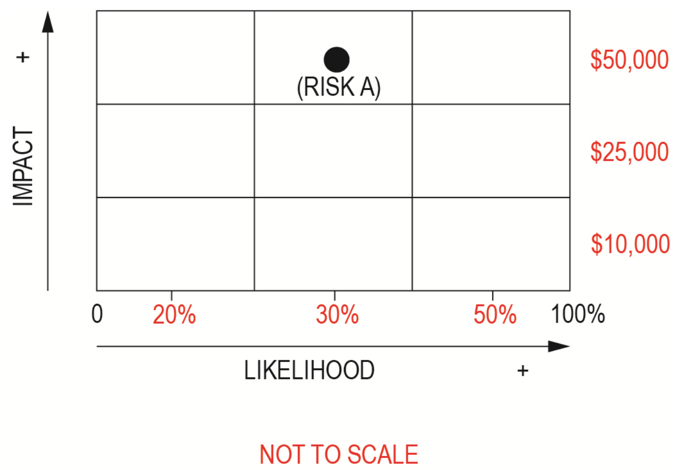
Question 15, p. 14

The risk management plan for your project defines impact levels 1, 2, and 3 as a cost impact of $10,000, $25,000, and $50,000 and a schedule impact of 1 week, 3 weeks, and 6 weeks. An activity on your project is on the critical path and is represented in your risk matrix as shown. The amount of risk contingency you should request for this part of your project is most nearly:



Question 22, p. 17

The options should read as follows:

- ○ A. 64,456
- ○ B. 64,753
- ○ C. 70,384
- ○ D. 74,088

Question 32, p. 22

Option D should read as follows:

- ☐ D. Product marketing cost

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Question 42, p. 27

The options should read as follows:

○ A. 0.16%

○ B. 2.70%

○ C. 5.26%

○ D. 13.16%

Question 46, p. 29

The question should read as follows:

An industrial engineer needs to determine the proper freight class for an LTL shipment of a vacuum hose. The hose is in a carton, and 32 cartons make a full pallet load. Pallets are standard 48 in. × 40 in. × 45.5 in. The cases are double stacked for shipment, and the resulting weight of the pallet is 243.2 lb. The pcf value (lb/ft^3) the engineer should use when determining the freight classification is most nearly:

Question 52, p. 32

Option D should read as follows:

○ D. $\log(y) = a + \log(b) \times \log(x)$

Question 79, p. 43:

This item was replaced as follows.

A sampling plan has a lot size of 120, a sample size of 20, and an acceptance of 1 or fewer. The probability of defect is 0.18. The average outgoing quality (AOQ) is ____________.

Enter your response in the blank.

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Question 80, p. 44

The question should read as follows:

A production facility is considering a new preventive maintenance policy. The engineering staff has collected the following data on a 250-hp electrical motor. The plant operates 8,760 hours a year. Cost of electricity is $0.07 per kWh and 1 kW is equal to 1.341 hp.

Factor	New Policy (Preventive Maintenance)	Existing Policy (No Maintenance)
% Time motor is used	70%	75%
Motor load factor	55%	55%
Motor efficiency	92%	85%
Cost of maintenance	$7,741.17	-

Compared to the annual cost to operate the motor without using preventive maintenance, the annual cost to operate the motor using preventive maintenance is:

- ○ A. smaller
- ○ B. larger
- ○ C. equal
- ○ D. not determinable with data given

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Solution 8, p. 51:

The solution should read as follows:

To maximize the value of Y, maximize the value of each half of the equation:

$$Y = 5 \times \frac{C_1}{C_2} - 3 \times \frac{C_3}{C_4}$$

For the first half of the equation this means selecting values for C_1 as large as possible, and for C_2 as small as possible, subject to the constraints. Therefore, $C_1 = 12$ and $C_2 = 15$.

The same logic is true for the second half of the equation, except the negative term means that the smallest absolute value should be selected. Therefore, $C_3 = 4$ and $C_4 = -3$.

Solving the equation for Y, $Y = 8$

C_1	12
C_2	15
C_3	4
C_4	–3
Y	8

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Solution 11, p. 52:

The solution should read as follows:

The critical path consists of activities B and E.

$$E_B = \frac{1+4(3)+5}{6} = 3$$

$$E_E = \frac{3+4(4)+5}{6} = 4$$

$$\text{Therefore, } E_{\text{critical path}} = 3+4=7$$

THE CORRECT ANSWER IS: A

Solution 22, p. 56:

The solution should read as follows:

24 hours × 7 days × 49 weeks × 9 machines = 74,088 total scheduled hours
74,088 × .95 = 70,384 available hours
70,384 × .92 = 64,753 machine hours available for processing

THE CORRECT ANSWER IS: B

Solution 32, p. 59:

THE CORRECT ANSWER IS: A, B, C

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Solution 38, p. 62:

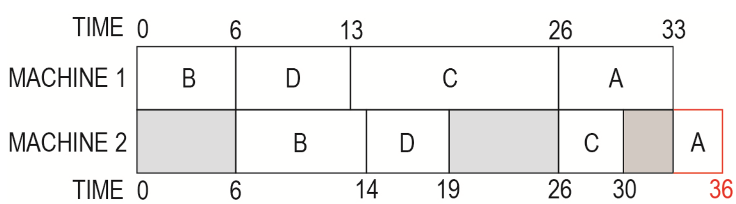
The solution should read as follows:

A = 500/20 = 25/day
B = 1,750/60 = 30/day
C = 2,750/120 = 23/day
Sum is 25 + 30 + 23 = 78/day

THE CORRECT ANSWER IS: 78

Solution 42, p. 63:

The solution should read as follows:



With B-D-C-A as the Johnson Rule solution, the elapsed time is 36 minutes. Therefore the total job completion time is reduced by (38 – 36)/38 × 100% = 5.26%

THE CORRECT ANSWER IS: C

Solution 46, p. 65:

The solution should read as follows:

The phrase "the cases are double stacked for shipment" is only a distractor. That is why the question does not define the term "cases."

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Solution 55, p. 67:

The multiplier table was removed.

Solution 79, p. 73:

The solution should read as follows:

$$
\begin{aligned}
P_a = \text{Probability of Acceptance} &= C_0^{20} \times 0.18^0 \times 0.82^{20} + C_1^{20} \times 0.18^1 \times 0.82^{19} \\
&= (1)(1)(0.019) + 20(0.18)(0.023) \\
&= 0.019 + 0.083 \\
&= 0.102
\end{aligned}
$$

$$\text{AOQ} = P \times P_a \times \frac{N-n}{N}$$

$$\text{AOQ} = (0.18)(0.102)(120-20)/(120)$$

$$\text{AOQ} = 0.0153$$

THE CORRECT ANSWER IS: 0.0153

Solution 80, p. 74:

The solution should read as follows:

Using 8,760 hours in a year:

The annual cost for operating the motor using preventive maintenance would be:
[(250 hp × (1 kW/1.341 hp) × 0.55 × 8,760 hr/yr × 0.70 × $0.07/kWh)]/0.92 + $7,741.17 = $55,580.63

The annual cost for operating the motor without using preventive maintenance would be:
[(250 hp × (1 kw/1.341 hp) × 0.55 × 8,760 hours/year × 0.75 x $0.07/kWh)]/0.85 + $0 = $55,477.69

Therefore, the annual cost for operating the motor using preventive maintenance is **larger** than the annual cost for operating the motor without using preventive maintenance.

THE CORRECT ANSWER IS: B