Congratulations! You passed!

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1. Sources of variation for products or services are the likely suspects for opportunities for improvement. In analyzing these sources, focus on the vital few over the trivial many. True or false? **1 / 1 point**

- (●) True
- ( ) False

Correct
Correct! Focus on the vital few over the trivial many in analyzing the source of variation.

2. The following is the brainstorming methodology where anyone can call out ideas in no order until all the ideas are out: **1 / 1 point**

- (●) Popcorn brainstorming methodology
- ( ) Round Robin brainstorming methodology

Correct
Correct! In Popcorn brainstorming methodology, anyone can call out ideas and no order until all the ideas are out.

3. Here is a problem statement: ATM hard faults average 0.94%. Your team wishes to identify the root cause using the "five why's" methodology and came up with the following factors and their associated percentages. Pick one of the factors that make the most sense to investigate further. **1 / 1 point**

- ( ) Cash not available (5%)
- ( ) Machine not replenished at all (5%)
- (●) Insufficient cash replenished (90%)

Correct
Correct! Investigate the factor that has the highest contribution to the problem statement, i.e., insufficient cash replenished (90%).

4. To ensure you've completely identified all possible causes in the "cause and effect diagram," consider the following factors: **1 / 1 point**

- [x] Mother nature

Correct
Correct! To ensure you've completely identified all possible causes in the "cause and effect diagram," consider mother nature (environment). There are other correct answers that should also be considered.

- [x] Measurements and materials

Correct
Correct! To ensure you've completely identified all possible causes in the "cause and effect diagram," consider measurements (quality specifications) and materials (input). There are other correct answers that should also be considered.

- [x] Men and women

Correct
Correct! To ensure you've completely identified all possible causes in the "cause and effect diagram," men and women (people). There are other correct answers that should also be considered.

5. You lead the additive manufacturing team in an automotive factory. Your team shares ten different improvement ideas. Which factors should you consider while evaluating potential improvement ideas? **1 / 1 point**

- [x] Cost to implement each improvement

Correct
Correct! Cost is a crucial factor in evaluating likely improvements. There are other correct answers.

- [x] Impact of each improvement

Correct
Correct! Impact is a crucial factor in evaluating likely improvements. There are other correct answers.

- [ ] No need to evaluate ideas, implement all ten of them
- [x] Potential risk of implementing each improvement

Correct
Correct! Potential risks are crucial factors in evaluating likely improvements. There are other correct answers.

6. One improvement idea to manufacture better is to invest in a collaborative robot (cobot). The cobot deployment will take four months. This initiative seems to face much resistance from production workers, as they think a cobot might replace their jobs. Based on the following figure, rate the risk to implement this potential solution. **1 / 1 point**

Risk ratings

7	No new technology, Implementation time < 1 month- few timing/political/cultural constraints
6	No new technology, Implementation time is between 1-3 months – few timing/political/cultural constraints
5	No new technology, Implementation time > 3 months – few timing/political/cultural constraints
4	No new technology, Implementation time < 3 months - moderate amount of timing/political/cultural constraints
3	New technology, Implementation time < 3 months - moderate amount of timing/political/cultural constraints
2	New technology, Implementation time < 3 months - many timing/political/cultural constraints
1	New technology, Implementation time is between 3-6 months – many timing/political/ cultural constraints
0	New technology, Technical Time greater than 6 months – many timing, political and cultural constraints

- (•) 1
- ( ) 2
- ( ) 3

Correct
Correct! Risk rating 1 is for new technology with implementation time between 3-6 months and many cultural constraints.

7. The cobot deployment will likely prevent the process defects caused by variation in your additive manufacturing process. This improvement will result in a lot of savings. Rate the impact of implementing this potential solution based on the following figure. **1 / 1 point**

Impact ratings

7	Improvement permanently removes the x from the process	Elimination of root cause
6	Improvement will permanently monitor the condition that negatively impacts x	Monitoring/flagging
5	Improvement will prevent defects caused by variation of x in process	Automation/standardization/ performance metrics
4	Improvement will prevent defects produced by x from being passed on but will not prevent occurrence	Inspection
3	Improvement will move the impact of x to area with better control the impact	Movement of work
2	Improvement will have a temporary positive impact on the defects produced by x but success dependent on people	Training
1	Impact will make those responsible for x aware of the defects resulting from x	Send a letter
0	Improvement has no effect on x	

- ( ) 7
- (•) 5
- ( ) 3

Correct
Correct! Rating 5 will prevent process defects caused by variation.

8. Your organization's milling machine produced 25% scrap of total parts milled. The organization CEO calls an all-hands-on-deck meeting. During this meeting, you discover that that the two likely factors contributing to high scrap are the machine speed and temperature independently. One of your engineers suggests conducting a one-factor-at-a-time (OFAT) study experiment on the contributions of factors independently to the high scrap. Is OFAT study the right approach? **1 / 1 point**

- (●) Yes
- ( ) No

Correct
Correct! OFAT approach is idle for studying one factor's contribution to the overall problem while holding other factors constant. This approach is appropriate for the milling scrap issue.

9. Identify the appropriate factor level for experimenting with the milling machine temperature. **1 / 1 point**

- [x] 800 degrees Celsius, 850 degrees Celsius, and 900 degrees Celsius

Correct
Correct! Since the experiment is measured in temperature, degrees Celsius makes sense. There are other right answer(s).

- [x] 1400 degrees Fahrenheit, 1500 degrees Fahrenheit, and 1600 degrees Fahrenheit

Correct
Correct! Since the experiment is measured in temperature, degrees Fahrenheit makes sense. There are other right answer(s).

- [ ] 60 revolutions per minute, 65 revolutions per minute and 70 revolutions per minute

10. What are the barriers to effectively experimenting with factors contributing to the milling process's high scrap rate? **1 / 1 point**

- ( ) Problem and goal statements are clear
- (●) Lack of management support
- ( ) Availability of adequate coaching and support

Correct
Correct! The lack of management support is a barrier to effective experimentation.