



Nine Hills Road, Cambridge CB2 1GE, England, United

# ILSSI MBB Exam Examples

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## MBB Example Open Ended Questions

(6 open ended questions are provided here as examples. The MBB exam will have 12 similar style questions).

### Question 1.

The Director of Operations for a transport wants to reduce the costs in the process for onboarding new clients. The Director wants to use Lean to achieve the cost reduction targets and asks for your advice.

Give:

- 1) Two reasons why using Lean Principles and Tools could be the correct choice for the company.
- 2) Two potential challenges in using Lean to achieve the objective (reasons why the initiative might fail), and
- 3) Two proposed initial steps to take. The Director will need to approve these initial steps with the Board of Directors.



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## Question 2.

### Scenario:

A fertilizer manufacturer wishes to increase the yield of the primary product of a complex chemical process. The product is of high value and the manufacturer is willing to invest large amounts of time and resources to achieve an increase in output yield.

A study of the process has identified 12 input factors which can be adjusted and which could impact the output yield.

The only data which currently exists for the process is the yield obtained using the current settings of the input factors identified, which have been used at their present values for a long period of time.

### Task:

State which experimental techniques (statistical or otherwise) you would use to identify how to improve the output yield.

## Question 3.

Describe the concept of 'Respect for Worker' and why is an important component in any organisation which wishes to reduce Muda, Mura and Muri. Your answer should also explain the concept of 'Gemba'.



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## Question 4.

### Scenario:

A change to a B2B website is to be tested. The website designers have created a method by which new visitors to the company website can be redirected in a random manner to the new website or to the existing website.

How successful each of the existing and new websites is can be measured in a numerical manner.

The project stakeholders wish to know as early as possible if the new website design is making a difference to how successful the website is.

You propose a statistical hypothesis test to establish whether the new design is making a difference.

The question is then asked "**how much can we rely on the result of this so-called hypothesis test?**"

### Task:

Using the following terms, seek to answer the question.

Terms to include in your answer: **Null Hypothesis, Alternative Hypothesis, Type I Error (Alpha error), Type II Error (Beta error), Power, Confidence Level**



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## Question 5.

This question consists of three parts. Answer all three.

1. In the 5S tool / methodology, what word (in English) is represented by the 5th 'S'?
2. Name three techniques that could be used in that 5th step of the 5S tool / methodology.

## Question 6.

State at which point in the DMAIC cycle is Business Risk most likely to become significant?

Discuss some methods and tools that can be used for the following.

- a) Identifying Business Risk due to a change in an existing process
- b) Quantifying Business Risk due to a change in an existing process
- c) Mitigating Business Risk due to a change in an existing process



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## ILSSI MBB Example Multiple Choice Questions

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### MC Q1:

A Design for Six Sigma (DFSS) Project can be created under which of the following conditions:

- A. There is no existing process, product, or service
- B. The current process, product, or service does not meet customer or company requirements
- C. There is no incremental improvement sufficient or possible to the existing process, product, or service
- D. The proposed improvement is a new process, product, or service
- E. All of the Above

E

### MC Q2:

The width of the Confidence Interval (CI) is based on Standard Error of the Mean and the Confidence Level required. How can we reduce the width of the Confidence Interval? (Only one statement applies).

- A. Reduce the sample size
- B. Remove all special cause variation first before proceeding
- C. Either increase the sample size or reduce the required Confidence Level or both
- D. Either increase the sample size or increase the required Confidence Level or both

C



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### MC Q3:

The measurement of which data type results in the smallest number of readings being required in order to establish a current process performance to within a specified level of confidence?

- A. Binary data e.g. Pass / Fail
- B. Continuous data e.g. time, distance
- C. Attribute data e.g. number of customer orders, categorised by products A, B and C
- D. Discrete data e.g. number of calls per hour to the call centre.

**B**

### MC Q4:

You have measured your blood pressure for 1 month and find it has a high value. After 15 measurements, the average of the 'high number' is 152. You have written down all of the individual 15 readings.

As a result of this high average, you visited your doctor and she prescribed you medication for this health issue. After a 'settling in' period for the new medication, you decide to measure your blood pressure again for a further month. You find that the average is now 140 after a further 15 readings.

What will you do to gain reassurance that the medication has made a significant difference to your blood pressure and decide to use a Hypothesis Test ? Please circle the statements that best apply.

- A. Proceed with t-tests if the p-values from the two Anderson-Darling tests are both less than 0.05
- B. If you were to find that the data sufficiently fits a Normal Distribution it would be suitable to perform a 2 sample t-test on the 'before' and 'after' sample readings.
- C. The Null Hypothesis for the 2 sample t-test is that your blood pressure after taking the medication is 'no different' than before (which you could describe as meaning "no significant difference between the samples").
- D. If the p-value from the hypothesis test is less than 0.05 then advise your doctor that your blood pressure has effectively dropped by less than 5%.



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- E. If the p-value from the hypothesis test is less than 0.05 then common cause variation is reasonably likely to explain any difference between the 'before' and 'after' samples.
- F. If the p-value from the hypothesis test is greater than 0.05 then your drop in blood pressure is not statistically significant at the 95% confidence level.

**B, C, F**

### MC Q5:

You are travelling on a spaceship on a mission to Mars.

You run a hypothesis test comparing plant growth in the on-board "greenhouse" at a temperature of 20 degrees Celsius and at 25 degrees Celsius. The P-value produced is 0.10. The crew ask you what this means. Which of these answers is the most appropriate to give?

- A. The difference in growth rates is 0.10 in other words 10%. It is a significant difference.
- B. The data is normally distributed therefore any difference is random.
- C. There is a 10% chance that the difference found could be due to random variation. You advise that temperature is not yet shown to be a significant factor.
- D. A false-positive has happened and you need to repeat the analysis with new sample

**C**



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## MC Q6:

The required lacquer thickness of Solar Panel cells must be between 14 and 20 microns for a cell to function correctly. The thickness measurement gauge gives results for the lacquer thickness across 20 individual cells and a colleague calculates the mean average of these results as 18.5 microns. The Solar Panel contains 10,000 cells. The gauge has been demonstrated to be functioning properly.

You wish to know with 95% confidence if the true ( population ) average thickness is within the specification limits.

Indicate which response is appropriate (only one response is to be indicated):

- A. You will have sufficient information to make a decision if you calculate some other statistics ( such standard deviation) and statistical analysis based on the set of 20 thickness measurements.
- B. The mean average is within the upper and lower limits so you approve the cells as good quality.
- C. You must have a sample size of at least 30 to have any understanding of the problem.
- D. You will need a correctly designed experiment (DOE) to come to a reliable conclusion.

**A ( need standard deviation or to put all individual results into stats tool such as Minitab and then run a )**