Sample Exam

Edition 202407

Content

Introduction

This is the EXIN LSSA Lean Six Sigma Yellow Belt (LSSYB.EN) sample exam. The Rules and Regulations for EXIN's examinations apply to this exam.

This exam consists of 50 multiple-choice questions. Each multiple-choice question has a number of possible answers, of which only one is correct.

The maximum number of points that can be obtained for this exam is 50. Each correct answer is worth 1 point. You need 32 points or more to pass the exam.

The time allowed for this exam is 60 minutes.

For this exam you are allowed to use a simple calculator.

You are allowed to use the exam literature for this exam.

Good luck!

Sample exam

1 / 50
Which is a principle of Lean?

A) Reduce the cost price
B) Identify the value stream and eliminate waste
C) Increase production with a reduced workforce
D) Reduce quality to increase profit

2 / 50
What is a **main** goal of data visualization?

A) Communicates findings and conclusions of data analysis to others
B) Enables the organization to be 80% correct today, rather than 100% correct in 6 months
C) Encourages out-of–the-box thinking to generate as many ideas as possible
D) Identifies and eliminates the root cause of faults or problems

3 / 50
What is the goal of a problem statement?

A) To define the scope of the project
B) To identify the correct members of the improvement team
C) To identify the necessity for action
D) To identify the risks for the project

4 / 50
Which statement is correct?

A) It is better to start with a Six Sigma project than with Lean.
B) Lean techniques are used to reduce variation.
C) Six Sigma techniques are used to reduce waste.
D) With Lean tools and techniques problems are identified and solved.

5 / 50
Which is a purpose of Short Interval Management (SIM)?

A) Create high-level visualization of the process
B) Identify the root cause of faults or problems
C) Trigger appropriate and timely action
D) Understand and prioritize customer requirements

6 / 50
What step in the 5S methodology requires that equipment safety and emergency procedures are defined?

A) Seiketsu - Standardize
B) Seiso - Shine
C) Seiton - Straighten
D) Shitsuke - Sustain

7 / 50
How are the inputs defined in the SIPOC technique?

A) Individuals or teams who provide inputs into the process
B) Items or information needed to execute the process and deliver the outputs
C) Measures of the process Critical to Quality (CTQ)
D) People who affect the process or benefit from the outcome

8 / 50
What metrics are considered **first** when deciding 'What to Measure' in a process?

A) Customer requirements
B) Input requirements
C) Process functionality
D) Supplier capability

9 / 50
What type of variation is caused by human error or a change in environmental factors, resulting in a non-random distribution of output?

A) Common cause variation
B) Natural variation
C) Non-assignable variation
D) Special cause variation

10 / 50
What type of data is sometimes called variable data?

A) Attribute
B) Categorical
C) Continuous
D) Ordinal

11 / 50
A business case compares the revenues of an improvement project with the necessary investment to be made.

What is the basis for these revenues?

A) Customer satisfaction scores
B) Employee satisfaction scores
C) Hard benefits
D) Soft benefits

12 / 50
Which item is **not** part of the first phase of a Lean Six Sigma project?

A) SIPOC
B) Solution Definition
C) Team composition
D) Voice of the Customer (VOC)

13 / 50
What is the purpose of the Define phase?

A) Define all critical project variables
B) Definition of suppliers of the mapped process
C) Map the process that causes the problem
D) Preliminary definition of the problem and evaluation of the expected financial return

14 / 50
5S workplace organization is a method that fits into one of the DMAIC phases.

What is the phase called?

A) Analyze
B) Define
C) Improve
D) Measure

15 / 50
The project leader of an improvement project must determine the project Critical to Quality (CTQ).

Which is the correct formulation for a CTQ?

A) Perfect delivery of the products
B) The delivery time of the products
C) The efficiency of the production process
D) The safety of the production process

16 / 50
Which is a focus of Operational Excellence?

A) Change management
B) Customer needs
C) Increasing sales
D) Management skills

17 / 50
When a data set is ordered in ascending order, what is the middle value of the data set called?

A) Center
B) Mean
C) Median
D) Range (R)

18 / 50
Which benefit is achieved from process mapping?

A) Defines the likely sources of defects in a product
B) Displays all process variables in a compact matrix
C) Distinguishes between the special and common causes of variation
D) Guides the team in the process activities

19 / 50
What quality activity is focused on preventing defects during production, rather than looking for defects in the end product?

A) Quality approval
B) Quality assurance
C) Quality control
D) Quality inspection

20 / 50
Please read the following list:

1. Number of features
2. Size in centimeters
3. Weight in kilograms
4. Pressure per square centimeter

Which are examples of continuous data?

A) 1, 2, 3
B) 1, 2, 4
C) 1, 3, 4
D) 2, 3, 4

21 / 50
A company produces parts for large car manufacturers, such as BMW and Volvo. Management at this company is committed to continuously improve manufacturing standards and practices.

Which method **best** suits this approach?

A) Kaizen
B) Poka Yoke / Error proofing
C) Teamwork
D) Visual management

22 / 50
A team has assessed all opportunities for improvement using a project priority diagram.

What opportunities for improvement can the team **best** start with, if they want to achieve a lot of impact with little effort?

A) 'Do not do'-projects
B) Major projects
C) 'Not now'-projects
D) Quick Wins

23 / 50
Which is a use of a concentration diagram?

A) Collecting data about defects or causes of defects
B) Documenting allowed responses to questions
C) Marking the location of product defects
D) Storing data as readings or counts

24 / 50
What company developed the Lean thought process?

A) Honda
B) Mitsubishi
C) Subaru
D) Toyota

25 / 50
Please read the following list:

1. Semi-finished products
2. Items made as they are needed
3. Minimal materials stocked
4. A process step may only produce after a signal of the next process step

Which are outcomes of implementing the Pull principle?

A) 1, 2, 3
B) 1, 2, 4
C) 1, 3, 4
D) 2, 3, 4

26 / 50
Please read the following list:

1. Affinity diagram
2. Clustering items together
3. 5S steps
4. 6 Ms

Which are common brainstorming techniques used when brainstorming causes of effects?

A) 1, 2, 3
B) 1, 2, 4
C) 1, 3, 4
D) 2, 3, 4

27 / 50
What is the takt time, given the following data?

- Working days per month: 21 days
- Working hours per day: 8 hours
- Lunch break per day: 30 minutes
- Customer demand: 500 pieces per month

A) 0.04 minutes
B) 18.9 minutes
C) 23.6 minutes
D) 2.5 hours

28 / 50
Which aspect of an organization is **most** likely to make a process of change difficult?

A) The financial stability and availability of funds
B) The organizational culture and structures in which it is embedded
C) The position within the market-place and its ability to compete
D) The production capacity and ability to meet customer demand

29 / 50
What is the purpose of a Bar chart?

A) Collect possible causes for a certain effect
B) Divide sample values into a certain number of intervals
C) Highlight the single most important factor in a set
D) Visually compare data measured by categories

30 / 50
What is the **primary** goal of the 5-Whys technique?

A) Determine how a solution will work
B) Eliminate a problem or defect
C) Identify the origin and reason for a problem
D) Prioritize a customer's requirements

31 / 50
What does a pull production system try to control?

A) Cycle time
B) Takt time
C) Throughput
D) Work in Process (WIP)

32 / 50
Which outcome results from implementing the 'Pull' principle?

A) Equipment running at maximum capacity
B) Excessive supplies of finished products
C) Just-in-time (JIT) inventory levels
D) Loss of potential profit

33 / 50
Which type of correlation is **not** a recognized relationship?

A) Negative correlation
B) No correlation
C) Positive correlation
D) Simple correlation

34 / 50
Which is an **important** requirement of the data collected when sampling data?

A) Based on random samples
B) Measured on a continuous scale
C) Qualitative in nature
D) Quick and easy to collect

35 / 50
Which type of waste is **most** likely to be the cause of an end product that fails to meet the customer's expectations?

A) Defects
B) Inventory
C) Over-processing
D) Transport

36 / 50
Which statement **best** describes a Critical to Quality (CTQ) measure?

A) It can be built into quality control processes.
B) It expresses who to contact if there are concerns.
C) It is a specific and measurable requirement.
D) It must rank its importance to the customer.

37 / 50
Which is the philosophy shared by Lean and Six Sigma?

A) Always set out to win, at the expense of all others
B) Doing the same work with less people
C) Enhance customer value to help an organization achieve its goals
D) Focus on producing higher volumes of stock and sell them cheap

38 / 50
What is the principle of Jidoka?

A) Prevention of failures to equipment is limited during production.
B) Processing and production is smoothed and unevenness reduced.
C) Production ceases if a problem is identified with the product.
D) Production is according to the rate of customer demand.

39 / 50
Which is the basis of hypothesis testing?

A) Assessing the potential of a process to produce products or services
B) Identifying the degree of correlation between two continuous variables
C) Investigating if a statement is true or false
D) Visualizing the data so it can be communicated efficiently

40 / 50
What is the correct sequence of actions for performing a hypothesis test?

A) Collect data, perform statistical test, formulate a hypothesis, draw conclusions based on the p-value found
B) Formulate a hypothesis, perform a statistical test, collect data, draw a conclusion based on the p-value found
C) Formulate a hypothesis, collect data, perform statistical test, draw conclusions based on the p-value found
D) Perform a statistical test, formulate a hypothesis, collect data, draw conclusions based on the p-value found

41 / 50
What Lean term is used to describe over-production, defects, inventory, and movement?

A) 5S steps
B) Overburden
C) Time and motion
D) Waste

42 / 50
Which is a statement about a Kaizen event?

A) Adopts a top-down approach
B) Aim is to increase cycle time
C) Focus is on waste elimination
D) Typically for major change projects

43 / 50
Which question should be investigated with the help of a simple, linear regression analysis?

A) The difference between the yield of the day shift, evening shift, and night shift in a production company
B) The difference in speed between a car, motorcycle, and truck
C) The relationship between the height and weight of people
D) The relationship between the height, gender, and weight of people

44 / 50
Which documentation describes how to accomplish a specific task within a Quality Management System (QMS)?

A) Records and forms
B) Standard operation procedure (SOP)
C) Statement of requirement
D) Time and motion study

45 / 50
Which activity does **not** belong to the Plan step in the PDCA approach?

A) Analyze the problem
B) Develop an improvement
C) Implement an improvement
D) Think up an improvement

46 / 50
Which is a Value-Adding activity?

A) An action in the process that prevents changes to a product or service
B) An action taken to correct a defect or error in the process
C) An activity required for the process that the customer does not want to pay for
D) An activity to change the product that the customer is willing to pay for

47 / 50
Which correlation coefficient represents the strongest correlation?

A) Correlation coefficient = - 0.9
B) Correlation coefficient = - 0.3
C) Correlation coefficient = 0
D) Correlation coefficient = 0.6

48 / 50
Which is **not** an example of visual management?

A) Andon light
B) Process flow mapping
C) Publication boards with pictures
D) Visual inspection

49 / 50
What role has a process improvement expert?

A) Champion
B) Master Black Belt
C) Orange Belt
D) Team member

50 / 50
What is **not** a characteristic of the normal distribution?

A) Is a continuous distribution
B) Is a discrete distribution
C) Is also called Gaussian distribution
D) Is one of the most used distributions

Answer key

1 / 50
Which is a principle of Lean?

A) Reduce the cost price
B) Identify the value stream and eliminate waste
C) Increase production with a reduced workforce
D) Reduce quality to increase profit

A) Incorrect.
B) Correct. One of the 5 Lean principles from Womack & Jones is: "Value stream: Identify the value stream and eliminate waste".
C) Incorrect.
D) Incorrect.

2 / 50
What is a **main** goal of data visualization?

A) Communicates findings and conclusions of data analysis to others
B) Enables the organization to be 80% correct today, rather than 100% correct in 6 months
C) Encourages out-of–the-box thinking to generate as many ideas as possible
D) Identifies and eliminates the root cause of faults or problems

A) Correct. Visualization of data has two key purposes:

1. To help in graphical data analysis to develop hypotheses regarding trends, groups, and correlations within the data. These hypotheses can then lead to further data collection and testing to draw a statistically valid conclusion from graphical data analysis.
2. To communicate findings and conclusions to others.

B) Incorrect.
C) Incorrect.
D) Incorrect.

3 / 50
What is the goal of a problem statement?

A) To define the scope of the project
B) To identify the correct members of the improvement team
C) To identify the necessity for action
D) To identify the risks for the project

A) Incorrect.
B) Incorrect.
C) Correct. A problem statement should be SMART and include a precise statement of the problem and goal, and whether it is urgent or has an impact on the organization.
D) Incorrect.

4 / 50
Which statement is correct?

A) It is better to start with a Six Sigma project than with Lean.
B) Lean techniques are used to reduce variation.
C) Six Sigma techniques are used to reduce waste.
D) With Lean tools and techniques problems are identified and solved.

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. Lean techniques are used to identify problems and to solve them. Lean techniques focus on reducing waste, whereas Six Sigma techniques focus on reducing variation. Start with reducing waste before reducing variation as it is easier to complete (as reflected in the CIMM).

5 / 50
Which is a purpose of Short Interval Management (SIM)?

A) Create high-level visualization of the process
B) Identify the root cause of faults or problems
C) Trigger appropriate and timely action
D) Understand and prioritize customer requirements

A) Incorrect.
B) Incorrect.
C) Correct. The SIM process engages team members to assess whether they are still on track to meet the established targets for the day. The term 'short interval' indicates that during the day, at specified intervals, the team's actual performance is compared to the planned performance for that interval. This action means that the team performance is checked regularly against the plan and reduces the response time if the team is underperforming, and corrective actions are needed. Therefore, SIM is a trigger for appropriate and timely action.
D) Incorrect.

6 / 50
What step in the 5S methodology requires that equipment safety and emergency procedures are defined?

A) Seiketsu - Standardize
B) Seiso - Shine
C) Seiton - Straighten
D) Shitsuke - Sustain

A) Correct. The Standardize step involves setting standards for cleaning, safety, and other procedures. The objective of the Straighten step is to identify the location for each item. The Shine step means that everything is constantly kept clean. The Sustain (final) step is about sustaining the professional work environment.
B) Incorrect.
C) Incorrect.
D) Incorrect.

7 / 50
How are the inputs defined in the SIPOC technique?

A) Individuals or teams who provide inputs into the process
B) Items or information needed to execute the process and deliver the outputs
C) Measures of the process Critical to Quality (CTQ)
D) People who affect the process or benefit from the outcome

A) Incorrect.
B) Correct. Inputs are those things needed to execute a process and deliver the outputs.
C) Incorrect.
D) Incorrect.

8 / 50
What metrics are considered **first** when deciding 'What to Measure' in a process?

A) Customer requirements
B) Input requirements
C) Process functionality
D) Supplier capability

A) Correct. One should start with the end in mind and consider the expected output in terms of customer requirements. What are the CTQ factors and measurable specifications of the requirement?
B) Incorrect.
C) Incorrect.
D) Incorrect.

9 / 50
What type of variation is caused by human error or a change in environmental factors, resulting in a non-random distribution of output?

A) Common cause variation
B) Natural variation
C) Non-assignable variation
D) Special cause variation

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. Special cause variation is caused by factors that result in a non-random distribution of output. Special cause variation is a shift or sudden change in output, caused by a specific factor such as environmental conditions, or process input parameters.

10 / 50
What type of data is sometimes called variable data?

A) Attribute
B) Categorical
C) Continuous
D) Ordinal

A) Incorrect.
B) Incorrect.
C) Correct. Continuous data are measured on a continuously varying scale; one that is infinitely divisible. Continuous data is sometimes called 'variable data'. Examples of continuous data are: dimensions, time, currency, weight, and resistance. Continuous data are expressed as any real number.
D) Incorrect.

11 / 50
A business case compares the revenues of an improvement project with the necessary investment to be made.

What is the basis for these revenues?

A) Customer satisfaction scores
B) Employee satisfaction scores
C) Hard benefits
D) Soft benefits

A) Incorrect.
B) Incorrect.
C) Correct. The revenues on which the business case of an improvement project is based, are the hard benefits. The other mentioned benefits are soft benefits.
D) Incorrect.

12 / 50
Which item is **not** part of the first phase of a Lean Six Sigma project?

A) SIPOC
B) Solution Definition
C) Team composition
D) Voice of the Customer (VOC)

A) Incorrect.
B) Correct. Solution Definition is part of the Improve phase, which is the fourth phase of a Lean Six Sigma project. The purpose of the Improve phase is to implement and verify solutions to the problem.
C) Incorrect.
D) Incorrect.

13 / 50
What is the purpose of the Define phase?

A) Define all critical project variables
B) Definition of suppliers of the mapped process
C) Map the process that causes the problem
D) Preliminary definition of the problem and evaluation of the expected financial return

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. The purpose of the Define phase is to clearly define the problem statement, the goals, the scope, and the high-level project timeline. This phase helps to clarify the understanding of why the problem is actually a problem. This is expressed as a financial measure.

14 / 50
5S workplace organization is a method that fits into one of the DMAIC phases.

What is the phase called?

A) Analyze
B) Define
C) Improve
D) Measure

A) Incorrect.
B) Incorrect.
C) Correct. The purpose of the Improve phase is to implement and verify solutions to the problem. TPM or 5S initiatives and Kaizen projects can be performed to eliminate waste or to resolve quality issues.
D) Incorrect.

15 / 50
The project leader of an improvement project must determine the project Critical to Quality (CTQ).

Which is the correct formulation for a CTQ?

A) Perfect delivery of the products
B) The delivery time of the products
C) The efficiency of the production process
D) The safety of the production process

A) Incorrect.
B) Correct. The internal CTQ (CTQ_{int}) is the metric that is related to what we measure in our product or process to verify the quality of the product or service. The CTQ_{int} is the measurable characteristic that represents the customer's need.
C) Incorrect.
D) Incorrect.

16 / 50
Which is a focus of Operational Excellence?

A) Change management
B) Customer needs
C) Increasing sales
D) Management skills

A) Incorrect.
B) Correct. The Operational Excellence strategy focuses on delivering to customer expectations, without failures, on time, and in a cost-efficient manner. The process involves focusing on the customers' needs, keeping the employees committed and empowered, and continually focusing on eliminating waste and variation in the process.
C) Incorrect.
D) Incorrect.

17 / 50
When a data set is ordered in ascending order, what is the middle value of the data set called?

A) Center
B) Mean
C) Median
D) Range (R)

A) Incorrect.
B) Incorrect.
C) Correct. The median is the middle number in a sorted, ascending or descending, list of numbers.
D) Incorrect.

18 / 50
Which benefit is achieved from process mapping?

A) Defines the likely sources of defects in a product
B) Displays all process variables in a compact matrix
C) Distinguishes between the special and common causes of variation
D) Guides the team in the process activities

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. Charting the process in a visual representation will work like a map to guide the team in the process activities.

19 / 50
What quality activity is focused on preventing defects during production, rather than looking for defects in the end product?

A) Quality approval
B) Quality assurance
C) Quality control
D) Quality inspection

A) Incorrect.
B) Correct. Quality assurance is a way of preventing mistakes or defects in products and avoiding problems when delivering solutions or services to customers. Quality assurance is process oriented and focuses on defect prevention rather than defect identification.
C) Incorrect.
D) Incorrect.

20 / 50
Please read the following list:

1. Number of features
2. Size in centimeters
3. Weight in kilograms
4. Pressure per square centimeter

Which are examples of continuous data?

A) 1, 2, 3
B) 1, 2, 4
C) 1, 3, 4
D) 2, 3, 4

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. Discrete data can only have discrete values, for example, the number of defects or the number of attributes, like counting. Examples of continuous data are: dimensions, time, currency, weight, and resistance. Continuous data are expressed as any real number. The number of features is always an integer, which makes it discrete data. The other three are (or can be) decimal numbers, which makes them continuous data.

21 / 50
A company produces parts for large car manufacturers, such as BMW and Volvo. Management at this company is committed to continuously improve manufacturing standards and practices.

Which method **best** suits this approach?

A) Kaizen
B) Poka Yoke / Error proofing
C) Teamwork
D) Visual management

A) Correct. Kaizen events are coupled very often to Standardized Work. If an abnormality occurs, always ask these questions: 'Was there no standard?', 'Was the standard followed?', 'Was the standard insufficient?'.
B) Incorrect.
C) Incorrect.
D) Incorrect.

22 / 50
A team has assessed all opportunities for improvement using a project priority diagram.

What opportunities for improvement can the team **best** start with, if they want to achieve a lot of impact with little effort?

A) 'Do not do'-projects
B) Major projects
C) 'Not now'-projects
D) Quick Wins

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. Quick wins are the opportunities to choose first, as they give a good return and require relatively little effort. These projects are called 'Low-hanging fruit' projects. Major projects are opportunities that give good returns but require a lot of effort. They can take a long time to complete and can be complex to execute. Don't do-projects: avoid these opportunities because they give low returns, and they waste time that would be better used on something else. 'Not now'-projects are opportunities one should not worry too much about until resources become available. There are better opportunities to work on.

23 / 50
Which is a use of a concentration diagram?

A) Collecting data about defects or causes of defects
B) Documenting allowed responses to questions
C) Marking the location of product defects
D) Storing data as readings or counts

A) Incorrect.
B) Incorrect.
C) Correct. A concentration diagram uses a picture or diagram of the product or document on which the location of defects, problems, or damage is then marked by the observer.
D) Incorrect.

24 / 50
What company developed the Lean thought process?

A) Honda
B) Mitsubishi
C) Subaru
D) Toyota

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. Just after World War II (1950), Toyota started looking at ways to improve production and later developed the 'Lean thought process'.

25 / 50
Please read the following list:

1. Semi-finished products
2. Items made as they are needed
3. Minimal materials stocked
4. A process step may only produce after a signal of the next process step

Which are outcomes of implementing the Pull principle?

A) 1, 2, 3
B) 1, 2, 4
C) 1, 3, 4
D) 2, 3, 4

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct.
1. Push production will result in excessive quantities of raw materials and excessive numbers of semi-finished products.
2. The Pull principle requires balancing production to meet demand.
3. Pull requires a 'Just in time' (JIT) principle. Supplying each operation step in the process with the right part, at the right time, in the right amount. It requires detailed forecasting of demand and supply.
4. The Pull principle is where the forecast-driven elements meet the demand-driven elements, reducing fluctuations.

26 / 50
Please read the following list:

1. Affinity diagram
2. Clustering items together
3. 5S steps
4. 6 Ms

Which are common brainstorming techniques used when brainstorming causes of effects?

A) 1, 2, 3
B) 1, 2, 4
C) 1, 3, 4
D) 2, 3, 4

A) Incorrect.
B) Correct.
1. The affinity diagram is a brainstorming tool used to organize causes or ideas. The technique is often used within problem-solving projects to create an overview after a brainstorm session about possible root causes or improvement suggestions.
2. Clustering items together is a part of the affinity diagram, in which items are clustered that are similar or can be combined in a certain way to get an overview after de brainstorm session.
3. The 5S technique exposes waste and prevents it from reoccurring in the future. In brainstorming, the 5-Whys method is used.
4. The purpose of the Ishikawa diagram is to collect possible causes for a certain effect by conducting a brainstorm session. To facilitate the thinking process of the attendees, six major groups of causes have been determined. These are called the 6 Ms.
C) Incorrect.
D) Incorrect.

27 / 50
What is the takt time, given the following data?

- Working days per month: 21 days
- Working hours per day: 8 hours
- Lunch break per day: 30 minutes
- Customer demand: 500 pieces per month

A) 0.04 minutes
B) 18.9 minutes
C) 23.6 minutes
D) 2.5 hours

A) Incorrect.
B) Correct.
takt time = (available work time) / (customer demand)
takt time = ((8 - 0.5) * 21) / 500 = 0.315 hours per part
0.315 hours = 0.315 * 60 = 18.9 minutes
C) Incorrect.
D) Incorrect.

28 / 50
Which aspect of an organization is **most** likely to make a process of change difficult?

A) The financial stability and availability of funds
B) The organizational culture and structures in which it is embedded
C) The position within the market-place and its ability to compete
D) The production capacity and ability to meet customer demand

A) Incorrect.
B) Correct. Organizational culture is the behavior of people within an organization as well as the meaning that everyone attaches to this behavior. These aspects together comprise the organizational culture that affects the collective way of thinking and working by people in the organization and determine the standards and values of an organization.
C) Incorrect.
D) Incorrect.

29 / 50
What is the purpose of a Bar chart?

A) Collect possible causes for a certain effect
B) Divide sample values into a certain number of intervals
C) Highlight the single most important factor in a set
D) Visually compare data measured by categories

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. Bar charts are used to visually compare category measures like quantities or frequencies for two or more groups.

30 / 50
What is the **primary** goal of the 5-Whys technique?

A) Determine how a solution will work
B) Eliminate a problem or defect
C) Identify the origin and reason for a problem
D) Prioritize a customer's requirements

A) Incorrect.
B) Incorrect.
C) Correct. The 5-Whys is an iterative question-asking technique used to explore the Cause-and-Effect relationship underlying a particular problem. The primary goal is to determine the root cause of a defect or problem.
D) Incorrect.

31 / 50
What does a pull production system try to control?

A) Cycle time
B) Takt time
C) Throughput
D) Work in Process (WIP)

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. A pull system starts production when a customer demands a product. Subsequently, as process steps only start producing when the next process steps allow it to do so. As a result, pull controls the WIP. Pull itself does not change cycle time. Takt time is defined by the customer demand given the available working time. Throughput is not a formally defined quantity.

32 / 50
Which outcome results from implementing the 'Pull' principle?

A) Equipment running at maximum capacity
B) Excessive supplies of finished products
C) Just-in-time (JIT) inventory levels
D) Loss of potential profit

A) Incorrect.
B) Incorrect.
C) Correct. Working according to Pull will avoid inventory and overproduction. This can be achieved by supplying each operation step in a process with the right part, in the right amount, at the right time.
D) Incorrect.

33 / 50
Which type of correlation is **not** a recognized relationship?

A) Negative correlation
B) No correlation
C) Positive correlation
D) Simple correlation

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. The three types of correlation within a scatter diagram are 'No correlation', 'Positive correlation' and 'Negative correlation'.

34 / 50
Which is an **important** requirement of the data collected when sampling data?

A) Based on random samples
B) Measured on a continuous scale
C) Qualitative in nature
D) Quick and easy to collect

A) Correct. When sampling data it is always important to achieve a representative sample which is an accurate, proportional depiction of the population under study.
B) Incorrect.
C) Incorrect.
D) Incorrect.

35 / 50
Which type of waste is **most** likely to be the cause of an end product that fails to meet the customer's expectations?

A) Defects
B) Inventory
C) Over-processing
D) Transport

A) Correct. A defect directly causes the product to fail customer expectations. Transport and Inventory can be part of the normal process delivering a valuable product although it might be done faster and/or cheaper. Over-processing means that more work is done in the process than needed but still good products can be delivered.
B) Incorrect.
C) Incorrect.
D) Incorrect.

36 / 50
Which statement **best** describes a Critical to Quality (CTQ) measure?

A) It can be built into quality control processes.
B) It expresses who to contact if there are concerns.
C) It is a specific and measurable requirement.
D) It must rank its importance to the customer.

A) Incorrect.
B) Incorrect.
C) Correct. CTQs should be defined and measurable.
D) Incorrect.

37 / 50
Which is the philosophy shared by Lean and Six Sigma?

A) Always set out to win, at the expense of all others
B) Doing the same work with less people
C) Enhance customer value to help an organization achieve its goals
D) Focus on producing higher volumes of stock and sell them cheap

A) Incorrect.
B) Incorrect.
C) Correct. A strong foundation of improving customer value leads to developing a thorough understanding of how improving customer values will aid the objectives of the organization.
D) Incorrect.

38 / 50
What is the principle of Jidoka?

A) Prevention of failures to equipment is limited during production.
B) Processing and production is smoothed and unevenness reduced.
C) Production ceases if a problem is identified with the product.
D) Production is according to the rate of customer demand.

A) Incorrect.
B) Incorrect.
C) Correct. Jidoka is the principle that every person is authorized to stop the line when a quality problem occurs. It is each person's obligation to stop the line when a quality problem occurs.
D) Incorrect.

39 / 50
Which is the basis of hypothesis testing?

A) Assessing the potential of a process to produce products or services
B) Identifying the degree of correlation between two continuous variables
C) Investigating if a statement is true or false
D) Visualizing the data so it can be communicated efficiently

A) Incorrect.
B) Incorrect.
C) Correct. Hypothesis testing is used to investigate if a statement is true or false.
D) Incorrect.

40 / 50
What is the correct sequence of actions for performing a hypothesis test?

A) Collect data, perform statistical test, formulate a hypothesis, draw conclusions based on the p-value found
B) Formulate a hypothesis, perform a statistical test, collect data, draw a conclusion based on the p-value found
C) Formulate a hypothesis, collect data, perform statistical test, draw conclusions based on the p-value found
D) Perform a statistical test, formulate a hypothesis, collect data, draw conclusions based on the p-value found

A) Incorrect.
B) Incorrect.
C) Correct. The correct sequence is: formulate a hypothesis, collect data, perform statistical test, draw conclusions based on the p-value found. The first step is the hypothesis: what is the investigated question translated into a null-hypothesis and an alternative hypothesis? The next step is to collect data and do a statistical test. This test delivers a p-value on which the decision is made to accept the null-hypothesis or to reject it in favor of the alternative hypothesis.
D) Incorrect.

41 / 50
What Lean term is used to describe over-production, defects, inventory, and movement?

A) 5S steps
B) Overburden
C) Time and motion
D) Waste

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. A Non-Value Adding activity is classed as waste or Muda, which should be eliminated. There are eight types of waste: Overproduction, Waiting, Transport, Overprocessing, Inventory, Movement, Defects, and Unused Expertise.

42 / 50
Which is a statement about a Kaizen event?

A) Adopts a top-down approach
B) Aim is to increase cycle time
C) Focus is on waste elimination
D) Typically for major change projects

A) Incorrect.
B) Incorrect.
C) Correct. A Kaizen event is typically for a small improvement project, like waste elimination and cycle-time reduction.
D) Incorrect.

43 / 50
Which question should be investigated with the help of a simple, linear regression analysis?

A) The difference between the yield of the day shift, evening shift, and night shift in a production company
B) The difference in speed between a car, motorcycle, and truck
C) The relationship between the height and weight of people
D) The relationship between the height, gender, and weight of people

A) Incorrect.
B) Incorrect.
C) Correct. Simple linear regression shows the relation between two continuous variables like height and weight of people. More complex linear models investigate the relationship between more than two variables. Differences (not relationships) are usually investigated by using a hypothesis test.
D) Incorrect.

44 / 50
Which documentation describes how to accomplish a specific task within a Quality Management System (QMS)?

A) Records and forms
B) Standard operation procedure (SOP)
C) Statement of requirement
D) Time and motion study

A) Incorrect.
B) Correct. Standards defined in the Quality Management System (QMS) should be visible and attainable for everybody in the organization. For each operation step a standard operation procedure (SOP) is composed. The SOP documents the best practices for the current moment, but it may always be questioned, and further improvement opportunities can be sought.
C) Incorrect.
D) Incorrect.

45 / 50
Which activity does **not** belong to the Plan step in the PDCA approach?

A) Analyze the problem
B) Develop an improvement
C) Implement an improvement
D) Think up an improvement

A) Incorrect.
B) Incorrect.
C) Correct. The plan will be presented to the department leader to get approval to execute the plan. The plan is executed in the Do step.
D) Incorrect.

46 / 50
Which is a Value-Adding activity?

A) An action in the process that prevents changes to a product or service
B) An action taken to correct a defect or error in the process
C) An activity required for the process that the customer does not want to pay for
D) An activity to change the product that the customer is willing to pay for

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. A Value Adding activity must meet the following criteria: the customer is willing to pay for it, it must be done correctly the first time, and the action must change the product or service in some way. If one of the criteria is not met, the activity is classified as a Non-Value Adding activity.

47 / 50
Which correlation coefficient represents the strongest correlation?

A) Correlation coefficient = - 0.9
B) Correlation coefficient = - 0.3
C) Correlation coefficient = 0
D) Correlation coefficient = 0.6

A) Correct. A correlation is a number between -1 and +1. A number near the outer values -1 and +1 indicates a strong correlation. A correlation close to 0 indicates a weak correlation or no correlation. The absolute value of the correlation is an indication of the power of the correlation. Therefore, -0.9 is the strongest correlation.
B) Incorrect.
C) Incorrect.
D) Incorrect.

48 / 50
Which is **not** an example of visual management?

A) Andon light
B) Process flow mapping
C) Publication boards with pictures
D) Visual inspection

A) Incorrect.
B) Incorrect.
C) Incorrect.
D) Correct. A visual inspection is a quality control method. A visual workplace simply means to make everything visible. This is achieved by improving communication, reducing complexity, and making abnormalities visible.

49 / 50
What role has a process improvement expert?

A) Champion
B) Master Black Belt
C) Orange Belt
D) Team member

A) Incorrect.
B) Correct. The Master Black Belt is a process improvement expert.
C) Incorrect.
D) Incorrect.

50 / 50
What is **not** a characteristic of the normal distribution?

A) Is a continuous distribution
B) Is a discrete distribution
C) Is also called Gaussian distribution
D) Is one of the most used distributions

A) Incorrect.
B) Correct. The normal distribution is the most frequently used distribution. It is a continuous distribution and is sometimes called the Gaussian distribution after its founding father Gauss.
C) Incorrect.
D) Incorrect.

Evaluation

The table below shows the correct answers to the questions in this sample exam.

Question	Answer	Question	Answer
1	B	**26**	B
2	A	**27**	B
3	C	**28**	B
4	D	**29**	D
5	C	**30**	C
6	A	**31**	D
7	B	**32**	C
8	A	**33**	D
9	D	**34**	A
10	C	**35**	A
11	C	**36**	C
12	B	**37**	C
13	D	**38**	C
14	C	**39**	C
15	B	**40**	C
16	B	**41**	D
17	C	**42**	C
18	D	**43**	C
19	B	**44**	B
20	D	**45**	C
21	A	**46**	D
22	D	**47**	A
23	C	**48**	D
24	D	**49**	B
25	D	**50**	B

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