

## Problem 1DQE

### Step-by-step solution

step 1 of 1

Quality is an attribute of the product that determines its fitness for use. Quality being an attribute of a product is not easy to define or it is not possible to give a more perfect definition for it. Quality is a relative term and a lot of opportunity is available for improvement in any process. It is a qualitative measure, an aesthetic value not to be measured by numbers. It is the characteristics a product should possess. We say a product in the market is of good quality when it satisfies certain specifications that are required for its long lasting performance.

When we have a product from different company and we opt to choose one may be from our past experience with that company we say the product is of better quality.

Quality is varying aspect for example quality of the food it appears different in different persons perspective. However we try to associate numerical value on the basis of the general trend.

To achieve a particular standard we must strive hard and that standard which is the prime factor is the quality.

Quality does not always implies the highest standard of the manufactured product but the required standard is the one below the highest standard.

It cannot be precisely defined it is a varying measure.

## Problem 2DQE

### Step-by-step solution

step 1 of 1

Quality is an attribute of the product that determines its fitness for use. Quality being an attribute of a product is not easy to define or give a perfect apt definition for it.

By Quality of a product we mean it has to satisfy the customer's expectations. Since consumers decision factor solely depends on the quality of a product in the competitive world, quality has become the important decision factor.

In order to deal with the real meaning of quality Dr. Garvin identified some of the basic qualities or dimension a product which it should have by which he addressed the empirical relationship between the quality and some of its essential variables.

Eight dimensions of quality are briefly discussed as follows:

1. Performance: by performance we mean whether a product is intended to do a particular job. This is basically accessing the performance standard of the product. Statistical software is intended to do all the statistical analysis perfectly without any difficulty it has to meet the needs of the consumer it has to meet the expectations. After that only it will be declared a product that meets the performance standard.

2. Durability: nothing lasts forever .but each and every thing has got life and by life of a product we mean it needs to last for reasonably a good period of time. Home appliances and automobile industries are established good example of durability. When we buy some product worth some dollars we will definitely expect that product to last for some period of time so a quality product has to satisfy this need.

3. Reliability: Reliability of a product lies with how often it fails to perform during a particular period of time. For example if we buy a motor car or a washing machine it is expected that it will require some service or repair ,if it requires repair quite often we will get fed up with the product and establish that particular product unreliable.

4. Serviceability: generally a customer's view of a product is highly influenced by the availability of service for the company from which a product is purchased.

It lies with the quick and economically fit service is offered by the company.

Home appliances, automobile industries and many other industries are viewed by the customers in this aspect.

5. Features: quality of product is generally associated with the added new feature. A product on any means will survive in the market only if it is upgraded each and every time. It is customer's nature to compare the product in the market with other products based on the added features it has.

6. Aesthetics: It is generally the appearance of a product. A product with good appearance will always be preferred in the market taking into account the shape, color, trendy appearance etc...an old wine in a new bottle strategy.

7. Perceived quality: it is mainly the reputation of the company which launches the product in the market.

A well established company's reputation always speaks about the quality of the company's products because of the past reputation of the company. Generally we rely on some airlines or particular brand because of our past experience with them. We rely on them for their quality.

For example if we are continuously purchasing some provisions from a particular shop we will be happy about their service and the durability of the product we always rely on them.

8. Conformance to the standard: generally minute parts of the engines or any machines have to be in exactly the intended size and shape in order to fit properly to the machines. If it is something small or in larger size then it will not exactly fit properly which will prohibits the proper functioning of the machine. Hence any product which is made has to be same as what a designer intend to be.

## Problem 3DQE

### Step-by-step solution

step 1 of 1

Let us select laptops which have been an essential part of the every activity and let us discuss the eight dimensions of the quality it require in order to have the acceptance of the customers.

1. Performance: by performance we mean whether a product is intended to do a particular job. This is basically accessing the performance standard of the product. Laptop is an electronic machine and is used by almost all the employee in a concern. Its performance like it should serve the purpose of it being used for what it is intended to. Its speed in calculating its capacity to hold the data always speaks for its performance. Hence it should meet all these required criterions.

2. Durability: nothing lasts forever .but each and every thing has got life and by life of a product we mean it needs to last for reasonably a good period of time. Generally a life of a laptops ranges from 5 to 7 years beyond which it can also be used. Durability of the components and the battery etc... will speak about the durability.

3. Reliability: Reliability of a product lies with how often it fails to perform during a particular period of time. Laptops are intended to work for certain period of time without causing any problem. Then only we will rely on certain company's laptops which are problem free for some period of time. Hence reliability is also an essential quality that's why people generally go in for some brands companies.

4. Serviceability: generally a customer's view of a product is highly influenced by the availability of service for the company from which a product is purchased.

It lies with the quick and economically fit service is offered by the company.

For example when there is some problem with the laptop some companies gives extended warranty within which if anything happens to the components will be replaced complete free of charges. And the approachability some companies also offer door step service which saves time and also conveyance.

5. Features: quality of product is generally associated with the added new feature. A product on any means will survive in the market only if it is upgraded each and every time. It is customer's nature to compare the product in the market with other products based on the added features it has. A laptop with added features like light weight and sleek in nature and extended battery backups will be more appealing in the market than the other products.

6. Aesthetics: It is generally the appearance of a product. A product with good appearance will always be preferred in the market taking into account the shape, color, trendy appearance etc...an old wine in a new bottle strategy.a laptop with more color choice and the appealing look will establish this quality.

7. Perceived quality: it is mainly the reputation of the company which launches the product in the market.

A well established company's reputation always speaks about the quality of the company's products because of the past reputation of the company. Generally we rely on some airlines or particular brand because of our past experience with them. We rely on them for their quality.

We generally go in for some company's product or purchase laptops from a particular standard company because of their reputation over a year which has been built because of its service rendered.

8. Conformance to the standard: generally minute parts of the laptops have to be in exactly the intended size and shape in order to fit properly to the machines. If it is something small or in larger size then it will not exactly fit properly which will prohibits the proper functioning of the laptops. Hence all the essential and minute parts have to be fixed together for the proper functioning.

These are the essential quality aspects a laptop should have in order to be successful in the market.

## Problem 4DQE

### Step-by-step solution

step 1 of 1

Let us understand the concept of what quality of service is and the quality of manufactured product.

Quality of service is nothing but a simple act that happens directly between the customer and the service of an organization and that particular act has got immense meaning in it.

Quality of service is nothing but how well the service rendered to the customer has met the customer's satisfaction. It is a qualitative quantity and in precise it is the expectation of the customer and it measures how a customer's expectation about a particular product is met.

Both the quality of the manufactured product and the quality of service is impacted by the satisfaction of the customers.

The customer's satisfaction level affects the intention to purchase any product, the revenue and also the customer's loyalty towards a product.

For example when a product is to be purchased from a particular outlet and when a customer approaches a particular store the act of quality of service starts from here. How well the customer is received and how they are explained about the products they are going to purchase determines the service quality.

After purchasing is the time of delivery is maintained and if during the course of time if something a repair occurs to that how well and quickly the service is done the way the service is one also determines the quality of the service. To retaining a customer with an organization is more important than accruing a new customer.

Quality of manufactured product is nothing but the product quality, which is the ability to satisfy the expectation of the customer. The quality of the manufactured product has been without any defects and it must meet the satisfaction of the customer. In short the quality of the manufactured product is the measure of how well a product which is delivered to the customer meets the customer's expectation.

If we purchase a product and we are satisfied about the features and other specification we have asked for and the product serves the purpose without any complaints then we say that the quality of the product is good otherwise not. The specification differs from product to product.

No doubt from the explanations given that there is a difference in the quality of the manufactured product and quality service and they are interlinked.

Comparatively the role of quality service has got more hand in the secret of business success than the quality of the manufactured product. It is the general nature for the people to go out of their way to purchase and pay for a quality good service. The quality of the manufactured product comes after the service quality.

## Problem 5DQE

### Step-by-step solution

step 1 of 1

Quality is a multidimensional quantity which is required for any organizational growth and for their winning strategy in the competitive environment. Quality is an attribute of the product that determines its fitness for use. Quality being an attribute of a product is not easy to define or give a perfect apt definition for it.

By Quality of a product we mean it has to satisfy the customer's expectations. Since consumers' decision factor solely depends on the quality of a product in the competitive world, quality has become the important decision factor.

In order to deal with the real meaning of quality Dr. Garvin identified some of the basic qualities or dimension a product which it should have by which he addressed the empirical relationship between the quality and some of its essential variables.

The essential dimensions namely the performance, reliability, durability of a product, serviceability and the aesthetics of the product, the features, perceived quality of the product which conforms to the established standard elaborates the necessary aspects of the quality in an organization. With all these eight dimensions a product is fit to use. But when it comes to fitness for use the product must be of perfect design and it should conform to the quality standards. Both the quality design and quality service are the important aspect of quality dimension.

Naturally the multidimensional aspect of quality leads to improved product design. Each product will be of different levels or grades of quality and these grade variations are intentional and this difference is due to the type of materials used and various other aspects. Various kinds and model of automobiles with different price ratings are available in the market and each type will have different designs and the type of materials use may be different and each is designed with some specification as per the original design.

So we cannot say that some of them are not fit to use because of their quality grade each of the product is made with specification to a particular design and one may be better than the other but each one is made for certain purpose. For example automobiles may have both diesel and petrol engines. Both engines have their own advantages and are designed to serve some purpose like diesel engine is economical but when it comes to maintenance aspect petrol engine overrules it.

Design is a quality aspect where as service is yet more important quality aspect than the design. Service in simple word is a direct act between the customer and the person who is a representative of an organization. Without quality service a product cannot survive in the market in spite of its superior design. So the understanding of the multidimensional aspect of quality will lead to better service than the quality design.

## Problem 6DQE

### Step-by-step solution

step 1 of 1

For a well functioning of a company or a shop or a manufacturer customers and customer satisfaction are of at most important. In general two types of customers are essential for a company namely external customers and internal customers. External customers are those who buy product from the company as they are the main source of the revenue stream for a company.

Internal customers are those works for the company and they are the part of the company.

Examples of external customers are those who work for the company like employees they earn salary from the company but they contribute hard work to the company in return. The suppliers of raw material, the retailer of the company who buys product from them and markets them outside are best example of the internal customers.

The function as a continuous chain in the organization and any break in the chain will lead to the loss for the company; hence the chain has to be maintained in a proper way.

The chain will break due to improper handling namely lack of communication, improper coordination and lack of care and concern for the employees who work for the organization. In order to prevent the breakage of the internal chain the following steps have to be taken care of:

The employees have to be treated with good care and respect. Respect their values and feelings. Proactive care like lending a helping hand during the time of their needs has to be in proper functioning. Like vendor who purchases goods from the company employees has also to be treated in the same way.

There needs to be a healthy relationship between the management and its employees. Always encourage them with bonus and perks as a role of motivation process.

Proper employees training has to be implemented, which helps in proper functioning of the company. By following all the above mentioned steps we make the employees happy and retain them with the organization. Retaining employees in the organization is more important for the growth of any organization. And from the quality perspective retaining good hardworking employee will lead to the quality improvement.

## Problem 7DQE

### Step-by-step solution

step 1 of 1

Edward W. Deming was an American statistician who was inspired by Walter A. Shewart, the developer of control charts and he made use of Shewart's ideas with his own twist.

Basically Deming's philosophy is based on the management principal of how an industry can improve quality and reduce cost by making use of his principles.

Being a statistician his principles are based on statistical methods and on management strategy and no way less to Juran's philosophy.

Deming's philosophy is best illustrated after they were adopted by the Japanese industry. Deming's philosophy basically deals with the discussion of 14 points based on the management principles. He used more of statistical methods and he took hold of the expansion of the Japanese industry and economy. Japanese has created award for quality improvement in his honor.

He was also a critic of many American management practices and principles.

Joseph M. Juran, one of the founding fathers of the quality control worked for Walter A. Shewhart at Bell Laboratory and was the leading head of quality throughout his career.

Basically his quality management philosophy so called the Juran Trilogy has got three components namely

- Quality planning
- Quality control and
- Quality improvement.

When compared with Juran, Deming used more of statistical methods in the management process since he was inspired by Shewart. According to his 14 points statistical methods such as control charts and designed experiments helps in the management process.

## Problem 8DQE

### Step-by-step solution

step 1 of 1

Joseph M. Juran, one of the founding fathers of the quality control worked for Walter A. Shewhart at Bell Laboratory and was the leading head of quality throughout his career.

Basically his quality management philosophy so called the Juran Trilogy has got three components namely

- Quality planning
- Quality control and
- Quality improvement.

The first phase namely the quality planning is nothing but the process of developing the products in order to meet the customers need.

The product and the process which satisfies the customers need are first identified and processed and developed. This planning process also involves quality improvement on regular basis. This planning phase will have to go ahead with the operating phase.

Quality control involves the proper execution of the plan and identifying the defects for rectification. Statistical process control is one of the tools for quality maintenance. A check of what is happening in the process has to be monitored in order to maintain and execute the actual plan and the defects in the process have to rectify in order to achieve the desired standard.

Finally the third component is quality improvement is basically improve the process to the required standard. Basically improvement is the result of studying or observing the process which consequently result in a relatively rapid improvement in the performance.

Hence these are the three components of the Juran Trilogy.

## Problem 9DQE

### Step-by-step solution

step 1 of 3

The three primary tools that are essential for quality control and improvement are

- SPC-statistical process control
- Design of experiments
- Acceptance sampling

To control and maintain the quality of the manufactured product is of foremost importance in any production process so that the manufactured products tend to conform to a particular standard. This statistical process is achieved through the statistical process control tools called the control charts initially pioneered by Walter A. Shewhart. These control charts were also called as the Shewhart control charts. The main purpose of control charts is to check whether the process is conforming to the standards and to reduce the variability in any ongoing process keeping in consideration the cost factor. The control chart has a central line with an upper control and a lower control limit lines just above and below the central line. The central line indicates where the process characteristic should lie in the absence of any variation in the process. The upper control limit and the lower control limits limit lines shows the limit to which the variation in the process is acceptable beyond which serious consideration is required.

A control charts hence serve the purpose of process monitoring thus aiding in identifying the potential problems that are encountered in any process. It helps in taking corrective action when needed and to remove the unusual sources of variability in a process. Hence systematic use of the control chart aids in excellent way to reduce the variability in the process.

step 2 of 3

Design of experiments involves and it includes proper planning of an experimental design with the help of the statistical analysis in hand. It is helpful in identifying the key variable that influences a quality characteristic of a process. Experiments that are designed with the help of statistical tools are highly important and they are useful in reducing the variability of the in the quality characteristic. It also optimize the process performance. One of the major types of the experimental design is the factorial design in which all the underlying factors are analyzed in various combination at different levels. Designed experiments are in general used during the initialization of the design. In factor analysis factor rotation is also an important concept that deals with how the particular group of correlated.

step 3 of 3

Now the third area of concern is acceptance sampling. Acceptance sampling is one of the areas of concern in quality control and it is the process in which the produced units or products are tested to find out whether they are conforming to the standards. Acceptance sampling is nothing but inspection and testing of a product which is one of the earliest aspects of quality control. In short acceptance sampling is defined as the inspection and classification based on the samples selected from a lot at random and ultimate decision is arrived about the acceptance of the lot with respect to the raw materials or components.

In acceptance sampling the sample taken from the lot are inspected and the decision to accept the lot or to reject is arrived at. If the lot is rejected, the lots are either recycled or reworked or it is replaced with good units. This case is called rectifying inspection.

Hence these three tools are essential in a quality system and they are immense tools for quality planning and improvement.

## Problem 10DQE

### Step-by-step solution

step 1 of 1

An effective management of quality involves the successive execution of quality planning, quality assurance and quality control and improvement.

Quality planning basically involves the identification of the internal and external customers and the needs and expectation towards a product. The eight dimensions of quality namely the performance, reliability, durability of a product, serviceability and the aesthetics of the product, the features, perceived quality of the product which conforms to the established standard elaborates the necessary aspects of the quality in an organization and it is essential for proper quality planning.

Without proper quality planning time and money of the organization is wasted by the organization in faulty design, manufacturing effects, customer complaints and ultimately results in failure of an organization.

The quality assurance which is the set of activities that involves systematic measurement, checking the quality control of the process, comparing with standard and monitoring of the process. It is nothing but the error management and guarantees the ensured quality of a product.

Quality control and improvement aims to improve a process from the current level to a higher level which helps in building a better future for an organization.

An organization's strategic management of quality involves these three components. Quality planning involves the initial process of identification of the requirements of the customers in a quality achievement process. Quality assurance guarantees the product for conformance to the standard that it involves all the steps required for the guaranteed quality output. Whereas quality control and improvement try to maintain the present quality and also to achieve something better than the current level.

So these three components are required and are interwoven to achieve a better quality standard.

## Problem 11DQE

### Step-by-step solution

step 1 of 1

**MBNQA**, the Malcolm Baldrige National quality award was created in 1984 is recognition of the performance excellence of U.S. organization given by the president of United States of America. It is created to encourage performance excellence of the business organization in United States under five categories. They are education, manufacturing and services, business, nonprofit organization and health care.

Generally organizations compete for this award and many organizations make use of the performance excellence criteria for self assessment and improvement. The award was named after the late secretary of commerce Malcolm Baldrige.

The organization that applies for the award is judged by an independent board of examiners who are highly qualified volunteers from different fields. The organization applies for the awards are judged on the basis of seven areas of achievement called the Baldrige criteria for performance excellence.

The seven areas of achievements and excellence are leadership, strategic planning, human resources development, process management and business results.

An organization which intends to apply sends the completed application to the national institute of standards and technology which administers the award.

An organization which has been scored by the panel of judges will decide whether they will continue to consensus. During the phase the panel of examiners who scored the original application will determine the consensus scores for each of the items. Once a conclusion is reached generally the judges go in for a sight visit to the organization with a team consisting of six members. It is a visit of one week who produces the site visit report. The report of the site visit is used by the judges, to decide the final winner of the Malcolm Baldrige National quality award.

## Problem 12DQE

### Step-by-step solution

step 1 of 1

Walter A. Shewhart:

Walter A. Shewhart who was considered as the true father of the modern quality control was an engineer and a statistician working at Bell telephone laboratories. He held responsible for improving the quality of the manufactured telephones.

He is the person who contributes much to the development of the control charts. The epoch making discovery and development of the control charts were made by Shewhart in 1924 and his discoveries were purely based on the probability and sampling.

He introduced a chart in the internal Bell Labs memo in order to graphically display variation in the process over time and the charts he used which seems typically a time chart of a measure of quality is named after him as Shewhart's control charts in honor of him.

A control chart is nothing but a statistical tool applied in the process control its originator being Walter A. Shewhart. Statistical control charts were considered as the formal beginning of the statistical process control.

According to him the variation in any process is due to two causes namely the chance cause and the assignable causes. When the assignable cause of variation is not in control the process will run out of controls which pose a severe threat to the quality. Hence the short time focus of any quality control process is to detect a control the variation.

Shewhart summarized his concepts in quality control in his text book "Statistical Methods from the View Point of Quality Control".

## Problem 13DQE

### Step-by-step solution

step 1 of 5

Cost of quality is the cost incurred or it is the cost of not creating a quality product or quality service. In general aspect it is the cost associated with the categories like producing, identifying, avoiding or repairing the products that do not meet the specifications. When a work is not properly one it has to be reworked. In the same way when every time a work is reworked the cost associated with the quality increases.

Quality cost does not mean the cost associated with higher quality product but it is the cost incurred in order to prevent the defects that occur in a product during various processes.

Quality of cost has got four categories namely

- Prevention cost
- Appraisal cost
- External failure cost
- Internal failure cost

The first two types namely the prevention and appraisal costs are the cost that are incurred to rectify a product free of defect before they are delivered to a customer.

Prevention costs: this cost is the one which is associated with efforts in design and manufacturing that are directed towards the prevention of conformance.

For example a manufactured product a car is quality checked and the defects if any found in that like defective parts or improper fixing are rectified before it is delivered to the customer in order to maintain the quality aspect. For this purpose some cost is incurred for these fault rectification process and the cost associated for the rectification process is called the prevention cost.

Appraisal cost: this is the cost evolved with measuring, evaluating or auditing. Inspection and testing of products comes under this. Sometimes the testing may be destructive like testing of cracker, checking the life of a bulb etc...

Failure costs are those that are incurred when the product fails to conform to its product specification.

step 2 of 5

Internal failure cost is the deficiencies or it is the quality cost incurred for the defective items or the items non conformance to the standard by the product which is discovered before delivery of a product to the customers. It is the cost that is incurred when the manufactured products, components, materials and services fail to meet the quality requirement. Failure is detected before the delivery of the products to the customers and this cost is due to the failure of the product that is to be delivered and this cost would disappear in the absence of defect in the final product. The sub categories of internal failures are as follows.

Scrap: Scraps are the items which cannot be economically repaired and scrap includes the cost of material, net loss of labor and the overhead cost resulting from the product that are defective and which cannot be repaired or reused. The scrap cost also involves the cost for disposing scraps.

Rework is the cost which is incurred in correcting the defective units in order to make them to meet specifications. Rework cost also involves the additional operations are the corrective measures in the manufacturing process that are framed in order to clear out the chronic defects.

step 3 of 5

Failure analysis: In failure analysis some cost is incurred to find out the underlying reason for the product failure

Down time: It involves the cost of ideal production facilities for example some of the raw materials supplied by the suppliers which do not conform to the specification, which went undiscovered in receiving discussion

Yield losses: This loss is due to faulty equipments for example in filling jam bottles of specific measurements if the product is over filled because of the excessive variability in the filling equipments that are used in the products.

step 4 of 5

**Down grading:** Down grading is nothing but the price difference between the normal selling price and the reduced selling price due to various quality reasons, like a product that does not meet the specification of the customers. This kind of down grading is more common in textile industries when some garments or apparels do not meet the expectations of the customers. They are put in for second sale in which the original price is downgraded or pulled down (reduced) in order to sell the product. The problem with down grading is that the product will not recover the cost of manufacturing itself.

**Hardware and software redesigning:** It is cost incurred in correcting the hardware and the software designs.

Apart from the above mentioned factors various other causes are also responsible for the internal failure cost including inventory, missing information etc...

step 5 of 5

**External failure cost :** External failure cost occurs when a product is not performing satisfactorily after it is delivered to the customers. It is the quality cost associated with the defects. This involves free repairing cost during the warrant period and many more. The sub categories are discussed below:

**Returned product:** the cost associated with the receipt, handling and replacement of the product that are non-conforming to the standard returned by the customers.

**Warranty charges:** this is the cost associated with or the cost of servicing the product if it fails during the warranty period. This also includes the cost involved in product replacement during the warranty period when it does not conform to the specification.

**Adjustment of the complaints:** includes the cost involved in investigation and adjustment when the complaints are justified when it is attributable to non conformity.

**Indirect cost:** apart from the above mentioned cost there is lot more associated with the indirect cost like poor service quality, canceled products due which results in loss of new customers etc...

## Problem 14DQE

### Step-by-step solution

step 1 of 4

Before analyzing the important of internal and external cost let us see a brief explanation of these costs and the subcategories in that.

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step 2 of 4

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step 3 of 4

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step 4 of 4

After discussing about the internal and external cost we can very well come to the conclusion that both the costs are equally important and nothing is less than the other.

Both internal and external costs associates to the quality issues and both are important in terms of quality perspective.

## Problem 15DQE

### Step-by-step solution

step 1 of 1

A six sigma is a statistical process in which the manufactured products are 99.99% statistically expected to free of any defects. Generally products with multiple components have more chance to fail quiet often and six sigma process aims to reduce the chances of defects and variability among the components.

The concept of six sigma was first originated in the late 1980s in Motorola inc.. Its main aim is to reduce the variability in the process and the specification limits being at least six-standard deviation away from the mean. A control charts is nothing but a statistical tool applied in the process control its originator being Walter A. Shewhart. Statistical control charts were considered as the formal beginning of the statistical process control.

Six -sigma is the later development of the control charts in which the control limits are

6- Standard deviation from the central line.

Nowadays six- sigma is no more a Motorola concept alone but it has spread in almost all the organization that strives to achieve a better quality performance.

It has been a program which aims to achieve business performance both by the means of cost reduction and quality improvement .designation in the form of black, green and master black belts were awarded to individuals who are trained in the field of six-sigma. The possessors of the belt have special training and education on the statistical methods and the quality process improvement tools.

## Problem 16DQE

### Step-by-step solution

step 1 of 1

“Quality is the responsibility of the quality assurance organization”.

Quality assurance is defined as any systematic process of checking a process or a product which is being developed is meeting the standard specified by the company. It is a proactive process and it takes care of and it makes sure that the process of manufacturing a particular product adheres to the standards which are established.

The quality assurance which is the set of activities that involves systematic measurement, checking the quality control of the process, comparing with standard and monitoring of the process. It is nothing but the error management and guarantees the ensured quality of a product. Quality assurance makes sure that what we are doing is correct or not.

Quality assurance is the assurance that an organization gives in terms of the product it manufactures. It assures a quality product by maintaining its standard at each and every level of its manufacturing and delivering process. The quality is achieved by adapting the companies own standard and also through the ISO standards.

A company's management team decides the quality assurance policies and the objectives of the company. An external consultant is hired and he writes the companies policies and objectives and what can be done more. Then the company implements the guidelines .an external assessor then examines the process and the guidelines that whether they were in accordance with the ISO standard .finally the process is verified and certification is given.

Many companies have their own quality assurance department which increases a customer's confidence and the creditability of the company. Actual quality assurance was first initiated during the World War II in order to check the weapons used in the war for defects after they were manufactured. Now a day it detects the defective products before they are manufactured thus saving cost and time.

Quality is the responsibility of the quality assurance organization because when quality assurance is given by an organization it strives to work hard on it and maintains it in various processes. For the strategic management of quality, quality assurance is an important tool.

## Problem 17DQE

### Step-by-step solution

step 1 of 1

Before comparing and contrasting the philosophies of Deming and Juran let us see a brief introduction of these two of these top most statistician who contributed to the concept of quality control and quality improvement in managerial and industrial sector thus emerged as leaders.

Edward W. Deming was an American statistician who was inspired by Walter A. Shewart, the developer of control charts and he made use of Shewarts ideas with his own twist.

Basically Deming's philosophy is based on the management principal of how an industry can improve quality and reduce cost by making use of his principles.

Being a statistician his principles are based on statistical methods and on management strategy and no way less to Juran's philosophy.

Deming's philosophy is best illustrated after they were adopted by the Japanese industry. Deming's philosophy basically deals with the discussion of 14 points based on the management principles. He used more of statistical methods and he took hold of the expansion of the Japanese industry and economy. Japanese has created award for quality improvement in his honor.

He was also a critic of many American management practices and principles.

Joseph M. Juran, one of the founding father s of the quality control worked for Walter A. shewhart at bell laboratory and was the leading head of quality throughout his carrier.

Basically his quality management philosophy so called the juran trilogy has got three components namely

- Quality planning
- Quality control and
- Quality improvement.

The philosophy of both Deming and juran implies that the responsibility for quality spans the entire organization. Deming's philosophy is an important frame work for implementing quality and productivity improvement which are summarized in his 14 points. He insists on adopting a new philosophy which distinguishes us from others and also focusing on the training program for the employee is of key importance. His philosophy also focuses on the continuous improvement by means of leadership, by implementing of modern supervision techniques and eliminating the fear of asking questions among the employees.

In contrast jurans philosophy aims at quality and the three dimension of quality namely planning control and improvement. He addresses the external customer need and the quality of the process is improved more based on the customer needs.

He emphasized improvement on quality by project by project basis. Like Deming he also used designed experiments and statistical tools for quality improvement purposes.

More or less both of them are inspired by shewarts ideas contributed much to the quality control process which brought a master change in the industrial sector. More are less both of them stress the same ideas of quality and stress the importance of quality improvement in an organization.

## Problem 18DQE

### Step-by-step solution

step 1 of 1

In general an award is recognition of success in any field and is a motivational factor for the growing organizations to achieve better standard in quality. MBNQA, the Malcolm Bal ridge National quality award was purposively designed to award organization that maintains a good quality standard and to raise awareness among the organization about the quality implementation.

MBNQA, the Malcolm Bal ridge National quality award was created in 1984 in recognition of the performance excellence of U.S organization given by the president of United States of America. It is created to encourage performance excellence of the business organization in United States under six categories. They are education, manufacturing, services, business, nonprofit organization and health care.

Feedback is provided to the applicants at the three stages of the process. And many organizations have found the feedback useful in planning for the overall quality improvement of the organization.

Hence any organization which strives for improvement and development strives to achieve this award.

## Problem 19DQE

### Step-by-step solution

step 1 of 1

We do need to agree with the statement that without top management leadership quality improvement will not occur by any means. For any management process leader ship is essential since there is always some need for a team to be lead with success by a talented leader.

Many people have contributed much to the statistical methods of the quality improvement and we have seen some among them emerged as leaders. Without these leaders and their philosophies improvement and growth in the quality management could have been made possible.

In any industrial processes lot of process will be going on and there is a need for top leader to coordinate the process by and large by the means of taking control of all the ongoing process. Without a leader the process may come to a standstill situation which is not good for any sector. And also the needs of the employers and their doubts regarding the ongoing process have to cleared, which ultimately leads to the requirement of a lead.

Only if the problems of the employers are addressed an organization will function without which they fail to have faith and ultimately results in total disruption in the organization.

Hence it is true that without top management leadership quality improvement will not occur by any means.

## Problem 20DQE

### Step-by-step solution

step 1 of 1

ISO, the international standards organization was founded in the year 1946 in Genève Switzerland developed a series of standards for the quality SYSTEMS and the first standard of the quality system was issued in the year 1987. this standards is applicable to any type of organization and currently ISO 1900 series are widely in use. But ISO 1900 has got three standards

ISO 9000:2000 quality management system for fundamentals and vocabulary

ISO 9001:2000 quality management system –requirements

ISO 9004:2000 quality management system – guidelines for performance improvement

The ISO 9001:2000 has eight clauses

- Scope
- Normative reference
- Definitions
- Quality management system
- Management responsibility
- Resource management
- Product realization
- Measurement analysis and improvement

In order to become an ISO certified company it has to select a registrar in order to prepare a certification audit.

In this ISO 9000:2000 named as quality management system for fundamental principles and the explanation of the most important terms and also the definition of the vocabularies are explained.

The main principle is that the companies depends on the customers and the expectation and the satisfaction of the customers is of the foremost importance and taking care of these essential will ultimately provides a better future for the company.

The basic principle of the standard also deals with the leadership, the principle of leadership is essential for proper coordination in any process and the subordinates has to follow him with based on their confidence and the trust in their capacity without any fear.

Involvement of the personnel and proper approach are the basic things that are dealt in the standard.

Many organizations required ISO certified suppliers for their organization since it is considered an important standard that are more industry specific.

An aero space Basic Quality System Standard, AS9000 is an interpretation which was developed by major aerospace manufacturers. A telecom quality management and measurement standard, TL9000 is an interpretation developed by the telecom consortium.

Many more interpretations exist and there are also shortcomings and criticism exists regarding the ISO standards. A common criticism is against the documentation process the cost, paper work and the time involved in the process.

## Problem 21DQE

### Step-by-step solution

step 1 of 1

It is always necessary to consider the variability around the mean or nominal dimension as measure of quality. This assumption is essential for any process to be in control and is made use in the concept of the control charts a statistical measure of quality.

In general statistical process control comes into play when a large number of similar items are produced. Some amount of variability is always there in any process and especially when large numbers of similar items are produced. For example when some minute screw that are used for engines are produced it is not possible to produce all the screws with exactly the same measurements and some variability is attached to each and every screws produced which is the inherent variability usually measured by the standard deviation.

In the same way it is not possible to fill the same amount of milk in the entire number of container.

So here comes the concept of target value .so most of the processes will have a standard target value. Too much of milk filled in a pack will spill out while packing which is not economical for the manufacturer and too little will rise the consumer complaint issue. In the same way when the minute screw is not of proper measurement it will not fix properly in to the engine and prohibits the proper functioning of the engine.

The immense purpose of statistical quality control is to rise the signal when the process mean is moving out of the target value and also when the item to item variability increases. Hence the mean or the nominal dimension is considered as the target value and the variability around the value is measure an proper care is taken and rectified when the process move out of control.

## Problem 22DQE

### Step-by-step solution

step 1 of 1

MBNQA, the Malcolm Baldrige National quality award was created in 1984 is recognition of the performance excellence of U.S organization given by the president of United States of America. It is created to encourage performance excellence of the business organization in United States under five categories. They are education, manufacturing and services, business, nonprofit organization and health care.

Nestle Purina Pet Care Company has bagged the Malcolm Baldrige National quality award for the year 2010. NPCC is a company that manufactures animal foods and markets throughout the United States of America. NPCC is a part of the largest food chain company Nestle S.A. the main motto of the company is promoting responsible pet care and a positive bond between the pets and the people. The manufacturing organization has been recognized as the best industry for its outstanding safety performance and established as the most trusted company for pet products. It was the first consumer packaged Goods Company and first pet food manufacturer to receive the award. Among the total eighty three applicants who applied for the award NPCC was among the seven companies to receive the award in 2010.

MEDRAD a business of Bayer health care is a leading manufacturer of medical equipment. MEDRAD is a leading company that develops , markets and services various medical equipment that are used in effective treatment of various diseases. Its product is sold worldwide to hospitals and medical imaging centers and it includes devices and systems that are required for cardiology and radiology. MEDRAD bags its second award in the year 2010 its first being in the year 2003.

After getting the prestigious award the companies still aims to maintain its standard and win the award in the future.

## Problem 23DQE

### Step-by-step solution

step 1 of 1

Considering the visit to the fast food restaurant the customer is ordering a typical meal consisting of ten components .assuming that the probability of good quality on each meal component was increased to 0.999 then the probability of a good meal is given by

$$P = (0.999)^{10} \\ = 0.9900$$

P {single meal good} = 0.9900

Now it looks pretty good. This is better than the 99% chance that the customer experience will be satisfactory.

And the customer is a family of four we now assume independence the probability that all the four meals are good is

$$P = (0.9900)^4 \\ = 0.9607$$

This also looks pretty good. Now suppose that this hypothetical family of four visits this restaurant once in a month is

$$P = (0.9607)^{12}$$
$$= 0.6186$$

This is not good and not acceptable.

## Problem 24DQE

### Step-by-step solution

step 1 of 1

Considering the visit to the fast food restaurant the customer is ordering a typical meal consisting of ten components .assuming that the probability of good quality on each meal component was increased to 0.999 then the probability of a good meal is given by

$$P = (0.9999)^{10}$$
$$= 0.9990$$

P {single meal good} = 0.9990

Now it looks pretty good. This is better than the 99% chance that the customer experience will be satisfactory.

And the customer is a family of four we now assume independence the probability that all the four meals are good is

$$P = (0.9990)^4$$
$$= 0.9960$$

This also looks pretty good. There is a 99% chances that they enjoy a good quality meal is really acceptable. Now suppose that this hypothetical family of four visits this restaurant once in a month is

$$P = (0.9960)^{12}$$
$$= 0.9531$$

The probability of all the meals provided to the family throughout their visit during the year is 0.95.

This is acceptable for a family of four for each visit and annually.

## Problem 25DQE

### Step-by-step solution

step 1 of 1

A metrics is nothing but a measure of quality. Let us discuss the metrics for quality improvement in a hospital if we get a chance to improve the quality.

A quality metrics is the one which allows us to assess the quality of certain area for example in hospital compared to a standard criterion.

Structure measure or metrics:

It is merely the measure of the health care organization. Whether there are appropriate beds to cater the patients and the number of experience doctors or clinician to take care of the patients. It also includes Availability of doctors in emergency situation and to Access its capacity to provide the required health care services.

These part of the quality aspects has to be concentrated because in a hospital proper health providers and the facility to provide the health care facility is of for most importance on any cause.

Outcome measure:

It is the measure of the health status of the patient after the treatment is received. It evaluates the quality of the health care services provide to the patients. It also includes post medical care, post operative care.

Measure of patient experience:

It is the collection of the details from the patients about their experience with the hospital and the health care professionals during the treatment and after the treatment. It also includes the care provided to them during and after the procedures. It helps to access the humanitarian quality aspect which is an essential part of the quick recovery process of the patients.

Assess ability measure:

It measures the nearness to the health provider and also the adequate ambulance facility available in the hospital in order to cater during the emergency situation.

Cleanliness measure:

The cleanliness of the hospital also needs to be taken care of because a place meant to cure the disease should not be the one that provides the opportunity to procure more disease. So it seems to be an important measure which requires perfect attention for improvement.

Hence these are the measures that are to be improved in terms of quality and maintained for a proper health provider.

## Problem 26DQE

### Step-by-step solution

step 1 of 1

Six Sigma is a popular and efficient technique for quality improvement of products with multiple key components. It focusses on keeping the product defects or variability in product quality to a minimum. Additionally it also works on process improvement that is enhancing corporate business performance and decreasing costs. Over the years, there have been 2 generations of Six Sigma and the current being the third generation. The latest generation has many modifications and additions to improve performance such as on-time delivery, elimination of rework on budget preparation, minimization of customer delivery time or cycle time, etc.

Six sigma has also successfully incorporated two other tool sets with it, namely Lean systems and Design for Six Sigma (DFSS). Based on their requirements an organization may use either or both along with Six Sigma implementation. Lean systems mainly focus on elimination of waste, be it in the form of rework, long cycle times or waiting times between one value-added activities to another or scrap. A point to note is that rework and scrap are more often than not due to excess variability. Hence it is a common goal of both Six Sigma and Lean principles to minimize the same.

Six Sigma techniques especially combined with DFSS or Lean systems has achieved more success than its competitors. Six Sigma with its emphasis on process improvement by elimination of defects and reduced variability when combined with lean systems principles which aims at waste elimination, together improve overall business performance manifold.

## Problem 27DQE

### Step-by-step solution

step 1 of 2

The Toyota Production System is a quality and production enhancement tool that aims at eliminating overburden or decreasing in-process inventory, inconsistency, and waste. It focusses on rapid set up and a pull type production system. It categorizes waste into 7 types, for example, Waste of over production, Waste of waiting time, Waste of transportation, etc. and accordingly works on eliminating them.

step 2 of 2



In that it aims at waste elimination puts it in the same category as Lean systems. Six Sigma combined with DFSS or Lean principles is a far more effective tool as the Toyota Production System puts little emphasis on variability reduction which makes the task of in-process inventory reduction or creating a pull type production system almost impossible.

## Problem 28DQE

### Step-by-step solution

step 1 of 1

There has been substantial effort and research over the past decades to formulate tools that improve the overall quality of products, be it with respect to defects, saving inventory space, reducing waiting times, meeting delivery targets, and reducing or even better eliminating wastage. There have been many contributors and Henry Ford is a notable automobile magnate who contributed to quality improvement techniques. He implemented process and quality management practices in his assembly lines, in particular, in process inspection, self-checking and error free assembly concepts. In 1922, he co-wrote 'My life and work' which dealt in detail with waste elimination and improvement of process efficiency. He is the precursor for the lean systems' principles of today. In conclusion, he was instrumental in fine-tuning work methods for productivity and quality improvement.

## Problem 29DQE

### Step-by-step solution

step 1 of 4

Quality can be improved not only by reducing operational costs, and eliminating waste but also by improving process cycle times and meeting delivery targets.

step 2 of 4

Firstly an effective quality improvement tool such as Six Sigma combined with DFSS or Lean systems could help build a production plan with improved process cycles where there is effective time management such as reduced waiting times between activities, and elimination of waste which leads to higher production rates.

step 3 of 4

Secondly, inventory storage should be updated such that products which no longer are in demand do not increase inventory costs. It is better to keep stock of moving products and eliminate the rest.

step 4 of 4

Reducing delivery time improves quality as it improves the perceived quality of the product by the customer. His feedback will be positive which can lead to new client gains and repeat customers provided the products are durable, conform to standards and the other dimensions of quality.

## Problem 30DQE

### Step-by-step solution

step 1 of 2

It is common for companies to use external suppliers for some or all of their raw materials, components, parts, etc. A Supply Chain Management (SCM) is in place almost always to ensure an optimal system performance by good design, plan, execution, control and monitor of supply chain activities. SCM has three key activities namely, Supplier qualification, Supplier development and Supplier audits.

step 2 of 2

1. Supplier development programs focus on improving supplier performance.
2. Keeping the goal of quality improvement in mind, a supplier is trained and evaluated.
3. Feedback and information exchange takes place on data and process details.
4. Consulting services are used to work and achieve specific goals such as improved quality, lesser costs, quantity expansion, etc. For example, a Six Sigma program can be initiated in the supplier company by the SCM to reduce product variability and improve process cycles and ultimately improve the quality of the parts delivered.

## Problem 31DQE

### Step-by-step solution

step 1 of 1

Reliability is an important factor in the consideration of the quality of a product. Factors like how often it requires maintenance and how easy is to get it serviced increase reliability. It has a major impact on customer impressions, and in turn on the brand of the product. Reliability also matters in service and transactional oriented industries such as hospitals, restaurants, banks, etc. In these cases, the quality is additionally influenced by three more factors as follows.

1. Responsiveness: In other words, customer service of the organization. Whether they are receptive, open, and friendly and prompt in handling customer request. Here reliability of the organization comes into question whether it is honest in its efforts to respond and provide good service.
2. Professionalism: An example would be delayed service in a bank due to a long lunch break by an employee. This is an example of bad professionalism on part of the bank which fails to maintain decorum and hence proves unreliable. It is a mirror of the level of competency of the company for the services it supposedly provides.
3. Attentiveness: As the popular adage goes, "Customer is King", an organization that follows this saying creates new customer database and retains loyal customers. Personalized, one on one and sincere attention provided leaves a lasting impression on the customer.

When the above three factors are met, the trust or reliability on the service provided by an organization increases.