	Unit -1 Introduction	Answer
1	**How a quality can be quantified** A. Performance + Expectations B. Performance X Expectations C. Performance – Expectations D. Performance / Expectations **Explanation:** Quality can be quantified by Quality (Q) = Performance (P) /Expectations (E) So option D is correct	**D**
2	**Traditional culture of quality requirements focuses on** A. Product oriented B. Process oriented C. Customer oriented D. Supplier oriented **Explanation:** Traditional culture of quality requirements is Product oriented, whereas TQM culture is Process oriented. So option A is correct	**A**
3	**American quality guru who took the message of quality to Japan** A. Genichi Taguchi B. Masaaki Imai C. Shigeo Shingo D. W. Edwards Deming **Explanation:** American quality Guru's are W. Edward Deming, Walter Shewhart, Philip Crosby, Joseph M Juran. So option D is correct	**D**
4	**PDCA cycle is the contribution of** A. Walter Shewhart B. Philip Crosby C. Genichi Taguchi D. W. Edward Deming **Explanation:** W. Edward Deming contributions are 1. Deming's 14 points route to quality 2. Deming Cycle or PDCA cycle 3. Seven deadly diseases of Management 4. System of profound knowledge So option D is Correct	**D**

5	**In TQM , the contributions of quality Guru W. Edward Deming** A. Deming's 14 points B. Deming's Cycle C. System of profound knowledge D. All the above **Explanation:** W. Edward Deming contributions are 1. Deming's 14 points route to quality 2. Deming Cycle or PDCA cycle 3. Seven deadly diseases of Management 4. System of profound knowledge So option D is Correct	**D**
6	**Which one is Juran's "three- role model"** A. Supplier – Process – Customer B. Customer - Process – Customer C. Process – Customer – Supplier D. Process – Supplier – Customer **Explanation:** Juran's "Three role model" is Supplier – Process – Customer So option A is correct	**A**
7	**In TQM, how many elements are there in Quality statements** A. 1 B. 2 C. 3 D. 4 **Explanation:** Quality statements has three elements 1. Vision statement 2. Mission statement 3. Quality policy statement So option C is correct	**C**
8	**What are the elements of Quality statements** A. Vision statement B. Mission statement C. Quality policy statement D. All the above **Explanation:** Quality statements has three elements 1. Vision statement 2. Mission statement 3. Quality policy statement So option D is correct	**D**

9	**Quality Trilogy is the contributions of** A. Walter Shewhart B. Philip Crosby C. Joseph M Juran D. W. Edward Deming **Explanation:** Juran's Contributions are 1. Internal customer	**C**

	2. Cost of quality 3. Fitness of Use 4. Quality trilogy 5. Juran's 10 steps for quality improvement 6. Breakthrough concept So option C is correct	
10	**In TQM , the contributions of quality Guru Joseph M Juran** A. Internal Customer B. Cost of Quality C. Breakthrough Concept D. All the above **Explanation:** Juran's Contributions are 1. Internal customer 2. Cost of quality 3. Quality trilogy 4. Fitness of Use 5. Juran's 10 steps for quality improvement 6. Breakthrough concept So option D is correct	**D**
11	**The contributions of quality Guru Philip Crosby in TQM** A. PDCA Cycle B. Quality trilogy C. PDSA D. Concept of Zero defects **Explanation:** Philip Crosby's contributions are 1. Four absolutes of quality 2. 14 steps to quality management 3. Crosby's quality vaccine 4. Concept of Zero defects So option D is correct	**D**
12	**The contribution of Four absolute of Quality is given by** A. Walter Shewhart B. Philip Crosby C. Joseph M Juran D. W. Edward Deming **Explanation:** Philip Crosby's contributions are 1. Four absolutes of quality 2. 14 steps to quality management 3. Crosby's quality vaccine 4. Concept of Zero defects So option B is correct	**B**
13	**Cost of quality is given by costs of** A. Prevention + Appraisal +Internal failure +External failure B. Prevention + Appraisal C. Internal failure + External failure D. Appraisal + Internal failure	**A**

	Explanation: Cost of quality = Prevention cost + Appraisal cost + Internal failure cost + External failure cost So option A is correct	
14	**In components of CoQ, Cost of good quality contains** A. Prevention cost B. Appraisal cost C. Both A and B D. None of the above **Explanation:** CoQ of good quality = Prevention cost + Appraisal cost So option C is correct	**C**
15	**In components of CoQ, Cost of poor quality contains** A. Internal failure cost B. External failure cost C. Both A and B D. None of the above **Explanation:** CoQ of good quality = Internal failure cost + External failure cost So option C is correct	**C**
16	**The Teboul's customer satisfaction model depends on** A. Company offer B. Customer needs C. Both A and B D. None of the above **Explanation:** Teboul's customer satisfaction model is the intersection of Company offer and Customer needs So option C is correct	**C**
17	**Customer perception on quality contains** A. Performance B. Features C. Service D. All the above **Explanation:** Customer perception on quality are performance, Features, Service, Warranty, Price and Reputation So option D is correct	**D**

18	**Tools used for collecting customer complaints** A. Comment cards B. Focus groups C. Toll free Telephone numbers D. All the above **Explanation:** Tools used for receiving customer complaints 1. Comment Cards 2. Customer Questionnaire 3. Post-transaction surveys 4. Employee feedback 5.Focus groups 6.Toll free Telephone numbers. So option D is correct	**D**

19	**PDCA cycle stands for** A. Plan Do Check Act B. Plan Did Check Act C. Process Do Check Act D. Process Did Check Acknowledge **Explanation:** PDCA cycle stands for Plan Do Check Act as per E. Deming So option A is correct	**A**
20	**Dimensions of quality contains** A. Performance B. Reliability C. Conformance All the above **Explanation:** Dimensions of quality contains Performance, features, usability, conformance to standards/specifications, reliability, durability, maintainability. So option D is correct	**D**
21	**TQM culture of quality requirements focuses on** A. Product oriented B. Process oriented C. Customer oriented D. Supplier oriented **Explanation:** TQM culture of quality requirements is Process oriented, whereas Traditional culture is Product oriented. So option B is correct	**B**
22	**Dimensions of Service quality contains** A. Tangibles B. Reliability C. Assurance D. All the above **Explanation:** Dimensions of Service quality contains Tangibles , Reliability, Assurance, empathy, Responsiveness So option D is correct	**D**
23	**Japanese quality guru who developed new concepts in response to the American gurus** A. Walter Shewhart B. Philip Crosby C. Genichi Taguchi D. W. Edward Deming **Explanation:** Japanese quality guru are Genichi Taguchi, Masaaki Imai, Shigeo Shingo. So option C is correct	**C**

24	**In TQM, the customer need can be understandable by which model** A. Taguchi Model B. Kano Model C. Deming Model D. Kaizen Model **Explanation:**	**B**

	Kano proposed a model to understand the customer need. Whereas others contributions are not with respect to customer need. So option B is correct	
25	**The most common techniques used for analyzing the quality costs are** A. Trend Analysis B. Pareto Analysis C. Both A and B D. None of the above **Explanation:** The techniques **used for analyzing the quality costs are** Trend Analysis and Pareto Analysis So option C is correct	**C**
26	**In continuous improvement, PDSA stands for** A. Plan Do Study Act B. Plan Did Study Act C. Process Do Study Act D. Process Did Study Acknowledge **Explanation:** PDSA stands for Plan Do Study Act So option A is correct	**A**
27	**The system for causing quality is preventive, not appraisal is** A. First absolute B. Second absolute C. Third absolute D. Fourth absolute **Explanation:** First absolute: Definition of Quality Second absolute: The system for causing quality is preventive, not appraisal Third absolute: Zero defect Fourth absolute: The measurement of quality is the price of non-conformance, not indexes So option B is correct	**B**
28	**The Quality as " Fitness of Use" is given by** A. Walter Shewhart B. Philip Crosby C. Joseph M Juran D. W. Edward Deming **Explanation:** Juran's Contributions are 1. Internal customer 2. Cost of quality 3. Fitness of Use 4. Quality trilogy 5. Juran's 10 steps for quality improvement 6. Breakthrough concept So option C is correct	**C**

29	**Cost generated before the before a product is shipped as a result of non-conformance to requirements is** A. Appraisal cost B. Internal failure cost C. External failure cost	**B**

	D. Prevention cost **Explanation:** Internal failure cost: Cost generated before the before a product is shipped as a result of non-conformance to requirements. External failure cost: Cost generated before the after a product is shipped as a result of non-conformance to requirements So option B is correct	
30	**The expression of dissatisfaction with a product either orally or written is** A. Customer retention B. Customer satisfaction C. Customer complaints D. Customer service **Explanation:** Customer complaint is defined as The expression of dissatisfaction with a product either orally or written. So option C is correct	**C**
	UNIT-II TQM Principles	
31	**Success of each organization is depending on the performance of** a) Employer b) Management c) Employee d) Vendor **Explanation:** Employee involvement improves the quality and productivity at all levels of organization. So option c is correct	**c**
32	**A satisfied employee will be a** a) Manager b) High performer c) Motivator to others d) Team leader **Explanation:** A satisfied employee will improve their work continuously, find new goals and change challenges. So option b is correct	**b**
33	**Motivation includes** a) Job satisfaction b) Job enrichment c) Job enlargement d) All of the above **Explanation:** Motivation promotes job satisfaction and thus reduces absenteeism and turnover. So option d is correct	**d**

34	**Which is the process of stimulating people to actions to accomplish the goals?** a) Bonus b) Motivation c) Performance based incentive d) Promotion **Explanation:**	**b**

	Motivation is the process of inducing people inner drives and action towards certain goals. So option b is correct	
35	**Which theory emphasizes that, Unsatisfied need can influence the behavior, satisfied one will not act as a motivator?** **a) Maslow Theory** **b) Herzberg's Theory** **c) Expectancy theory** **d) Alderfer's ERG theory** **Explanation:** Maslow emphasizes that any unsatisfied need, whether of lower order or higher order, will motivate individuals. So option a is correct	**a**
36	**Which of the following is responsible for quality objective?** a) Top level management b) Middle level management c)Frontline management d)All of the above **Explanation:** It is the responsibility of top management to implement and maintain the quality policy. So option a is correct	**a**
37	**EMS stands for** a)Environmental management system b)Employees management system c)Engineering management system d)Equipment management system **Explanation:** An Environmental management system focuses resources on meeting the commitments identified in the organization's policy. So option a is correct	**a**
38	**Maslow says that Human beings are full of needs & wants. And these needs will lead to their?** a) Job b) Behavior c) Attitude d) Motivation **Explanation:** Maslow hierarchy states that a lower level must be completely satisfied and fulfilled before moving onto a higher pursuit. So option b is correct.	**b**
39	**The Need which improves the confidence level of an employee is** a) Social b) Safety c) Basic d) Esteem **Explanation:** Self esteem needs include those for self confidence, achievement, self-respect etc	**d**

	So option d is correct.	
40	**Which of the following is not a part of hygiene factor of two factor theory** a) Company policy b) Administration c) Responsibilities d) Interpersonal Relations **Explanation:** Hygiene factors are necessary to maintain a reasonable level of satisfaction among employees. So option c is correct.	**c**
41	**Responsibility, Advancement etc are example of** a) Motivators b) Hygiene factors c) Improvement factors d) Advance factors **Explanation:** **Total quality management** is a great **motivator** for employees as it taps their intellectual treasure for the success of the organization. So option a is correct.	**a**
42	**Continual improvement is in** a) Environmental objective b) Audit Result c) Corrective action d) All of the above **Explanation:** Continual improvement is an ongoing effort to improve products, services, or processes. So option d is correct.	**d**
43	**Kaizen is** a) Small change b) Big improvement c) Sudden impact d) All of the above **Explanation:** **Kaizen** is a Japanese term meaning "change for the better" or "continuous improvement." So option a is correct.	**a**
44	**While setting Quality objective, which need is to be considered.** a) Organization need b) Customer need c) Employees need d) All of the above **Explanation:** Quality objectives are measurable goals relevant to enhancing customer satisfaction and are consistent with the quality policy. So option b is correct.	**b**

45	**Plan-do-study-act cycle is a procedure to** a) Overall improvement b) Continuous improvement	**b**

	c) Permanent improvement d) Immediate improvement **Explanation:** PDSA cycle is an iterative four-step management method used in business for the control and continuous improvement of processes and products So option b is correct.	
46	**Quality practices must be carried out** a. at the start of the project b. throuout the life of the project c. at the end of the project d. no need to carry out quality practices **Explanation:** Quality practices, such as, teamwork and participation, customer focus and satisfaction, continuous improvement, were identified as best practices for TQM implementation. So option b is correct.	**b**
47	**Quality Trilogy includes** a) Quality planning b) quality improvement c) quality control d) All the three **Explanation:** Juran's trilogy," an approach to cross-functional management that is composed of three managerial processes: quality planning, quality control and quality improvement. So option d is correct.	**d**
48	**Kaizen is a – process the purpose of which goes beyond simple productivity improvement.** a) weekly b) daily c) monthly d) annual **Explanation:** **Kaizen** focuses on applying small, daily changes that result in major **improvements** over time. So option b is correct.	**b**
49	**"Poko-Yoke" is the Japanese term for** a) Card b) Fool proof c) Continuous improvement d) Fishbone diagram	**b**

	Explanation: SEIKETSU practices such as colour coding, Fool Proofing, Responsibility labels can be followed at the workplace. So option b is correct.	
50	**Identify the cost not likely to reduce as a result of better quality**. a) Maintenance costs b) Inspection costs c) Scrap costs d) Warranty and service costs **Explanation:** Maintenance cost are incurred not to reduce as a result of better quality So option a is correct.	**a**
51	**Quality Management includes forming and directing a team of people to achieve a qualitative goal within an effective cost and time frame that results in** a) a project completed in shortest possible time. b) a product or service that conforms to the required specifications. c) an award-winning product that brings public recognition to the project d) an innovative project that establishes qualification of the project team **Explanation:** Organizations seek sustained success through the implementation of a quality management system So option b is correct.	**b**
52	**Quality fulfils a need or expectation that is** a) Explicitly stated b) Implied c) Legally required d) All of the above **Explanation:** Quality refers to the set of inherent properties of an object that allows satisfying stated or implied needs. So option d is correct.	**d**
53	**Which of the following is not a target of Total Quality Management** a) Customer Satisfaction b) Reducing manpower c) Continuous Cost Reduction d) Continuous Operational Improvement **Explanation:** **Total quality management** (**TQM**) describes a management approach to long-term success through customer satisfaction.	**b**

	So option b is correct.	
54	**The roof of House of Quality shows the interrelationship between** a) Functional Requirements b) Design Attributes c) Service Process d) Manufacturing Process **Explanation:** HOQ is considered the primary tool used during quality function deployment to help facilitate group decision making. So option b is correct.	**b**
55	**Two major component of fitness of use are Quality Design and** a) Quality of Conformance b) Quality of Service c) Quality of Specification d) Quality of Manufacturing **Explanation:** The degree to which products conform to essential requirements and meet the needs of users for which they are intended. So option a is correct.	**a**
56	**Which is the set of activities that ensures the quality levels of product and services are properly maintained and that supplier and customer quality issues are properly resolved?** a) Quality Assurance b) Quality Planning c) Quality Control d) Quality Management **Explanation:** Quality Assurance (QA) is defined as an activity to ensure that an organization is providing the best possible product or service to customers. So option a is correct.	**a**
57	**Which of the following are responsible for Quality objective?** a) Top level management b) Middle level management c) Frontline management d) All of the above **Explanation:** Top level management shall demonstrate leadership and commitment with respect to the quality management system.	**a**

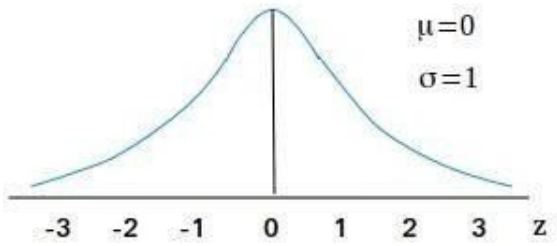
	So option a is correct.	
58	**While setting Quality objective, which need has to be considered.** a) Customer need b) Organizational need c) Supplier need d) Worker need **Explanation:** A customer need is a motive that prompts a customer to buy a product or service. So option a is correct.	**a**
59	**The role of management is to** a) provide Resources b) define EMS c) monitor the effectiveness of the system d) All of the above **Explanation:** Management responsibilities are to ensure operational efficiency, financial reporting quality, and compliance with applicable laws, regulations, rules, and standards. So option d is correct.	**d**
60	**Which refers to general processes of improvement and encompasses discontinuous improvements?** a) Continuous improvement b) Continual improvement c) Constant improvement d) Consecutive improvement **Explanation:** Continual improvement is the ongoing improvement of products, services or processes through incremental and breakthrough improvements. So option b is correct.	**b**
	UNIT-III TQM TOOLS AND TECHNIQUES I	
61	**Which of the following is not a process tool for TQM** A. process flow analysis B. histograms C. plier D. control charts **Explanation:** A process flow chart is a logical, relatively easy to understand chart, which displays how a process operates via using standard symbols to represent activity. Control used to study how a process changes over time. The Histogram is a kind of bar chart	**C**

	showing a distribution of variables or causes of problems. But plier is not a TQM tool.It is a manufacturing tool.	
62	**The charts that identify the potential causes for a particular quality problem.** A. Control Chart B. Flow chart C. Cause and Effect Diagram D. Pareto chart **Explanation:** Control used to study how a process changes over time. The Histogram is a kind of bar chart showing a distribution of variables or causes of problems. Flowcharting is typically used to map a process flow showing the beginning of a process, decision points, and the end of the process. A Pareto Chart is a graph that indicates the frequency of defects, as well as their cumulative impact. Cause and Effect Diagrams are charts that identify the potential causes for a particular quality problem.	**C**
63	**In six sigma, which of the following is defined as any process output that does not meet customer specification?** A. Error B. Cost C. Quality D. Defect **Explanation: Six Sigma** strategies seek to improve the quality of the output of a process by identifying and removing the causes of defects and minimizing impact variability in manufacturing and business processes.	**D**
64	**A Fish bone diagram is also known as** A. cause-and-effect diagram B. poka-yoke diagram C. Kaizen diagram D. Taguchi diagram **Explanation:** The **fishbone diagram** or **Ishikawa diagram** is a **cause-and-effect diagram** that helps managers to track down the reasons for imperfections, variations, defects, or failures. The **diagram** looks just like a fish's skeleton with the problem at its head and the causes for the problem feeding into the spine.	***A***
65	**A maturity model can be used as the benchmark for comparison and an aid to understanding** A. TRUE B. FALSE C. depends D. can't say **Explanation: Benchmarking** is a process of measuring the performance of a company's products, services, or processes against those of another business considered to be the best in the industry, aka "best in class." The point of **benchmarking** is to identify internal opportunities for improvement.	**A**

66	**DMAIC is**	**C**

	A. develop, multiply, analyze, improve, check B. define, muliply, analyze, improve, control C. define, measure, analyze, improve, control D. define, manufacture, analyze, improve, control **Explanation:** Define, measure, analyze, improve, and control (**DMAIC**) is a data-driven quality strategy used to improve processes. The letters in the acronym represent the five phases that make up the process, including the tools to use to complete those phases	
67	**Check sheet is used during which part of DMAIC** A. Define B. Measure C. Analyze D. Improve **Explanation: Check Sheets are** best **used** when the data can be collected by the same person or in the same location.Therefore it is in measure phase.	**B**
68	**Presence of one of the following after every stage of DMAIC allows for review of project and incorporation of suggestions.** A. Review gate B. Toll gate C. Decision gate D. None of these **Explanation:** A **DMAIC tollgate** (also called a "phase-gate" or "stage-gate") is a checkpoints allowing you to proceed through the **DMAIC** model. It marks your project officially progressing from one stage to the next.	**B**
69	**The Toyota production system is based on two pillars namely** A. Kaizen, Six Sigma B. Lean, Six Sigma C. Just in Time, Jidoka D. Just in Time, Kaizen **Explanation:Just-in-time** (**JIT**) **manufacturing**, also known as **just-in-time production** or the Toyota **Production** System (TPS), is a methodology aimed primarily at reducing **times** within the **production** system as well as response **times** from suppliers and to customers. **Jidoka** is a Lean method that is widely-adopted in manufacturing and product development. Also known as autonomation, it is a simple way of protecting your company from delivering products of low quality or defects to your customers while trying to keep up your takt time.	**C**

70	**The diagram shows the location of defect in any unit. This diagram is used in the analyze step of DMAIC** A. Affinity B. Relations C. Defect Concentration	**C**

	D. Scatter **Explanation:** The defect concentration diagram is a graphical tool that is useful in analyzing the causes of the product or part defects.	
71	**Which of the diagram is used to identify what might go wrong in a plan under development** A. Pareto Chart B. PDPC C. Arrow Diagram D. Matrix Diagram **Explanation:** The process decision program chart (**PDPC**) is a tool used to systematically identifies what might go.Obtain or develop a tree **diagram** of the proposed plan.	**B**
72	**The standard normal distribution has mean and standard deviation,** A. 1,0 B. 0,1 C. 0,0 **D.** 1,1 **Explanation:** The **standard normal distribution** is a **normal distribution** with a mean of zero and **standard** deviation of 1. The standard normal distribution curve  	**B**
73	**The sixsigma improvement project the least experienced individuals are** A. Green Belt B. Black belts C. Red Belts D. Master Black Belts **Explanation:** In six sigma training certificates, varies ranking levels are there,that are belt level rankings. A **Green Belt** has expertise **in Six Sigma** and has set their feet on the path toward leadership.	**A**
74	**Which of the following is not a use of arrow diagrams** A. Determining the best schedule for the entire project B. Potential Scheduling problem and solution C. Calculate critical path of the project	**D**

	D. Identifying defects in a process **Explanation:** The **arrow diagramming method** (ADM) refers to a schedule network **diagramming technique** in which the schedule activites within a given project are represented by the use of **arrows**. The beginning of the schedule activity is represented by the tail, or base, of the **arrow**.	
75	**Failure Mode and Effect Analysis, which prioritizes different sources of error is used in one of the following stage** A. Define B. Measure C. Improve D. Analyze **Explanation:** Failure mode and effects analysis (FMEA; often written with "failure modes" in plural) is the process of reviewing as many components, assemblies, and subsystems as possible to identify potential failure modes in a system and their causes and effects.	**D**
76	**What is the aim of fool proofing technique used for total quality management?** **A.** to achieve zero defects **B.** to specify time schedules **C.** to specify targets **D.** none of the above **Explanation:** A poka-yoke is any mechanism in any process that helps an equipment operator avoid (yokeru) mistakes (poka). Its purpose is to eliminate product defects by preventing, correcting, or drawing attention to human errors as they occur.	**A**
77	**Which of the following statements is/are false?** **1. Fault tree analysis method is used to determine reliability of product** **2. The goal of Six Sigma is to reduce number of defects to 2.4 parts per billion** **3. Six sigma is represented by normal distribution curve** **4. Poka yoke is a policy which prevents occurrence of human errors** **A.** Only statement 3 **B.** Statement 2 and statement 3 **C.** Statement 1, 3 and 4 **D.** Only statement 2 **Explanation:** The **goal** of Six Sigma is to increase profits by eliminating variability, defects and waste that undermine **customer loyalty**. Six Sigma can be understood/perceived at three levels: Metric: 3.4 Defects Per Million **Opportunities**.	**D**

78	**Benchmarking determines** A. Customer requirements B. Process capability C. How company is doing relative to others D. Getting ISO 9000 audit done E. If management is motivated	**C**

	Explanation: Benchmarking can become a tool to sustain this new **TQM** paradigm, providing a means to increase an organization's competitive performance by a comparison with the best-in-class.	
79	**Old Management Tools** A. Affinity diagram B. Decision Matrix C. Flow chart D. All of these, **Explanation:** New 7 tools Affinity Diagram. Arrow Diagram. Matrix Diagram. Nominal Group Technique (NGT) Process Decision Program Chart (PDPC) Relations Diagram. Tree Diagram.	**B**
80	**Need for new management Tools** A. Promote innovation B. Communicate information C. Successfully plan projects D. All of these E. None of these **Explanation:** New tools are more relational and network oriented.New tools may take more practice to develop proficiency.	**D**
81	**Bench marking process are** A. Introgation B. Action C. Maturity D. All the above **Explanation:** The key steps in benchmarking process are divided into five phases starting with the **planning** phase and evolving through **analysis**, integration, **action**, and finally **maturity**.	**D**
82	**Types of Bench Marking (BM)** A. Internal BM B. Competitive BM C. Functional BM D. Generic BM E. All the above **Explanation:** There are four main **types of benchmarking:**internal,Competitive ,Functional,Generic BM.	**E**
83	**Reliability of a product means** Consistency of performance Performance over period Free of technical errors The correct order is i& iii	**D**

	i& ii ii & iii i, ii & iii **Explanation: Reliability** is defined as the probability that a **product**, system, or service will perform its intended function adequately for a specified period of time, or will operate in a defined environment without failure.	
84	**Failure Rate is** A. Engineering system fails per hour B. Component fails per hour C. Both. D. None of the above. **Explanation: Failure rate** is the frequency with which an engineered system or component fails, expressed for example in **failures** per hour. It is often denoted by the Greek letter λ (lambda) and is important in reliability theory.	**C**
85	**Types of FMEA** A. Process FMEA B. Design FMEA C. Both D. None of these. **Explanation**: There are two important types of FMEA are Process FMEA, Design FMEA.	**C**
86	**Classifications of FEMA** A. Equipment FEMA B. Maintenance FEMA C. Service FEMA D. System FEMA E. All the above **Explanation:** Classification of FEMA: System **FMEA**, Design **FMEA**, Process **FMEA**, Service **FMEA**, Equipment **FMEA,** Maintenance **FMEA**, Concept **FMEA**, Environmental **FMEA**.	**E**
87	**Professionals ,if they have not undergone a formal certification program of six sigma. The following belt will be given.** A. Green belt B. Black belt C. White belt D. Yellow belt **Explanation:** Professionals are considered Six Sigma White Belts if they have not undergone a formal certification program or extended training.	**C**
88	**The Zero defect concept** A. Is a performance standard for management B. Is a motivational technique that promotes "doing it right the first time" C. Is used by management to communicate to all employees that everyone should do things right the first time D. A and C E. B and C **Explanation: Zero Defects** is a management tool aimed at the reduction of **defects** through prevention. It is directed at motivating people to prevent mistakes by	**D**

	developing a constant, conscious desire to do their job right the first time." — **Zero Defects**: A New Dimension in Quality Assurance.	
89	**The concept of Zero inventory is called** A. Six sigma B. Continuous improvement C. Just in Time D. Zero defects **Explanation:** A **system** in which a company keeps no or very little **inventory** in storage, simply ordering exactly what it needs to sell and receiving it in a timely manner. **Zero inventory** is the goal of just-in-time **inventory management** and the two terms are sometimes used to mean the same thing.	**C**
90	**Some organizations today are using six sigma to set the upper and lower limits on control charts rather than the traditional sigma** A. two B. three C. four D. five E. twelve **Explanation: Control limits** on a **control chart** are commonly drawn at 3s from the center line because **3-sigma limits** are a good balance point between two types of errors: Type I or alpha errors occur when a point falls outside the **control limits** even though no special cause is operating.	**B**
	UNIT-IV TQM TOOLS AND TECHNIQUES II	
91	**Which statistical technique integrates product design and manufacturing process?** a) Tree analysis b) Problem solving techniques c) Quality function deployment d) Taguchi approach **Explanation:** Taguchi's approach for quality combines statistical methods and engineering to achieve rapid movement in quality and cost by optimising the design of a product. It integrates manufacturing process and product design.	**d**
92	**What is the key step in Taguchi's approach?** a) Tolerance design b) System design c) Parameter design d) Process design **Explanation:** Taguchi's approach is based on integrating system design (initial design stage), parameter design (Testing various material combinations) and tolerance design (buying material of better grade). Parameter design is the key step as it offers the concept of uncontrollable factor.	**c**

93	**What is called the stratification of information?** a) Breaking down a whole group into smaller sub groups b) Isolating the vital few from the trivial many c) Grouping of scattered information d) Sequencing of processes in a quality system **Explanation:** Stratification of information is one of the statistical tools which means	**a**

	breaking down of the whole group into smaller sub-groups. Run charts, effect diagram, pareto diagram and scatter diagrams are also the statistical tools.	
94	**Which technique is used to relate complex cause and effect relationships?** a) Affinity diagram b) Pareto diagram c) Scatter diagram d) Interrelationship diagram **Explanation:** Interrelationship diagram is a quality improvement technique which shows the relationship between inter-related factors. This diagram displays the factors which are involved in complex problems.	**d**
95	**What is PDPC?** a) A statistical tool b) Quality improvement technique c) Quality assurance technique d) Statistical process control technique **Explanation:** PDPC is process decision program chart which helps in the selection of the best process to obtain desired result. It is a quality improvement technique. It evaluates existing process and also look at alternatives.	**b**
96	**What is the first step in problem solving process?** a) Plan b) Do c) Check d) Action **Explanation:** Problems are best solved by the cycle: Plan-Do-Check-Action. In planning, a course of action is planned according to customer requirement and conditions of service then the process must be executed according to this plan.	**a**
97	**How many control charts are normally used for statistical control of variables?** a) 1 b) 2 c) 3 d) 4 **Explanation:** Three control charts are normally used for statistical control of variables. These are i) Mean chart, ii) Range chart, and iii) standard deviation charts. Control charts help in the understanding of inherent capability of process and bring the process under control.	**c**
98	**Which tool is used to analyse the effects of a failure of individual components on the system?** a) FTA b) FMEA c) Quality circles d) Fool proofing **Explanation:** Failure mode and effect analysis (FMEA) is a statistical tool used to review the new product design with respect to the requirements of customers before it is sent to production. It is used basically to analyse the failure effect of individual components on the system as a whole.	**b**

99	**What is the formula for process capability index?** a) (1-K)Cp b) (1+K)Cp c) (1-Cp)K	**a**

	d) (1+Cp)K **Explanation:** Process capability index is also known as measure of process capability and denoted by C_{pk}. $C_{pk} = (1-K)*C_p$. K is the correction factor and always has a positive value. C_p is the process capability potential also known as process capability variation and is equal to the (Specification width divided by process width).	
100	**What is arrow diagram in TQM?** a) A diagram used to plan the most appropriate schedule b) Diagram shows the relationship strength between the variables c) Used large amount of data and organise it on the basis of natural relationship between items d) Diagram showing the sequencing and inter relationships between factors **Explanation:** Arrow diagram is a statistical tool used to plan the most appropriate schedule for any task and to effectively control it during the progress of the process. Arrow diagram helps in establishing the most suitable plan for a project.	**a**
101	**What is the aim of fool proofing technique used for total quality management?** a. to achieve zero defects b. to specify time schedules c. to specify targets d. none of the above **Explanation:** - The use of fool proofing technique eliminates human errors. Its aim is to obtain zero defects. - To avoid such errors certain devices are used which produce visual or sonic alarm when errors occur. - Proper lightening, clean working conditions and avoiding long hours of work can reduce errors.	**a**
102	**Match the following group 1 items with group 2 items** 1. Sort — A. Seitan 2. Set in order — B. Seiketsu 3. Shine — C. Seiri 4. Standardize — D. Seiso a. 1 – D, 2 – A, 3 – B, 4 – C b. 1 – C, 2 – A, 3 – D, 4 – B c. 1 – B, 2 – C, 3 – A, 4 – D d. 1 –A, 2 – C, 3 – D, 4 – B **Explanation:** The 5S are as follows: **1) Sort:** In this step unnecessary items are eliminated by placing a red flag on them. **2) Set in order:** This step helps in effective storage of items in an organized way. **3) Shine:** This step refers to cleaning of work piece. **4) Standardize:** According to this step, standards assigned in the organization are to be followed by workers and the duties are to be pre-assigned. **5) Sustain:** This step is difficult to implement and achieve.	**1 – C, 2 – A, 3 – D, 4 – B**

103	**What is meant by Kaizen?** a. card signal b. to avoid inadvertent errors c. change for better quality d. none of the above **Explanation:** Kaizen is a quality improvement method. Innovation along with Kaizen improves quality. Following are the principles of Kaizen: 1) Collecting relevant information	**c**

	2) Working as per plan 3) Avoiding wastage 4) Keeping appointments 5) Should follow PDCA cycle	
104	**Which of the following statements is/are false?** 1. Fault tree analysis method is used to determine reliability of product 2. The goal of Six Sigma is to reduce number of defects to 2.4 parts per billion 3. Six sigma is represented by normal distribution curve 4. Poka yoke is a policy which prevents occurrence of human errors a. Only statement 3 b. Statement 2 and statement 3 c. Statement 1, 3 and 4 d. Only statement 2 **Explanation:** **Fault tree analysis** - It is a mathematical analysis used to determine reliability of products. - The reliability (R) of a system is calculated by using the formula: R = 1 – Probability of failure - It graphically depicts combination of events which lead to failure of products. **Six Sigma** - Six sigma is a quality improvement programme which reduces number of defects to 3.4 parts per million. - The number of defects are just 3.4 parts per million, hence is considered as zero defect production. - It is represented by normal distribution curve. - High acceptable parts are produced using limits of ± 6σ **Poka yoke** - Poka Yoke is used to prevent human errors in production line. - The word Poka Yoke means avoiding inadvertent errors. - Poka Yoke satisfies three levels such as: error elimination, in process detection and out process detection.	**d**
105	**Which quality management program is related to the maintenance of plants and equipments?** a. Environmental management systems b. Fault tree analysis c. Failure mode effect analysis d. Total productive maintenance **Explanation:** - Total productive maintenance is related with maintenance of plants and equipments. - The main purpose of TPM is to avoid wastage, produce goods without any loss of quality, reduce costs, etc. - The main pillars of TPM are 5S, Kaizen, quality maintenance, office TPM, planned maintenance, training, safety, health and environment and autonomous maintenance. - In this process maintenance is considered useful and is considered as daily routine of the organization.	**d**

106	**The aim of Just-In-Time manufacturing principle is to eliminate** a. time wastage b. labour wastage c. cost of excessive inventory d. all of the above	**d**

	Explanation: - The main principle of JIT is to produce when and what is needed. It also considers the quantity needed. - JIT (Just-In-Time) aims at eliminating wastage of labour, time and cost of excessive inventory. - JIT is a pull type system. In this system, production originates only when an order is received.	
107	**Quality Function Deployment (QFD) is largely focused on:** a. **Reducing costs and preventing unnecessary costs prior to production** b. **To reduce the number of parts in a product** c. **Testing the robustness of a design** d. **Ensuring that the eventual design of a product or service meets customer needs Explanation: Quality Function Deployment** provides documentation for the decision- making process. **QFD** helps you to: Translate customer requirements into specific offering specifications. Prioritize possible offering specifications and make trade-off decisions based on weighted customer requirements and ranked competitive assessment.	**d**
108	**The main purpose of Taguchi methods is to:** a. Test the robustness of a design. b. Reduce costs and prevent any unnecessary costs before producing the product or service. c. Create a 'house of quality' d. Articulate the 'voice of the customer' **Explanation:** Taguchi method of quality control focuses on design and development to create efficient, reliable products	**a**
109	**Taguchi methods may be used in which part of the design process?** a. Preliminary design b. Screening c. Prototyping and final design d. Evaluation and improvement **Explanation: Taguchi Method** is a process/product optimization **method** that is based on 8-steps of planning, conducting and evaluating results of matrix experiments to determine the best levels of control factors	**d**
110	**Control chart is** i. Process monitoring tool ii. Process control tool iii. Process planning tool The Correct Answer is a. i only b. i & ii c. i, ii & iii d. None of the above **Explanation: Control charts** are the tools in **control** processes to determine whether a manufacturing process or a business process is in a controlled statistical state.This **chart** is a graph which is used to study process changes over time.	**b**

111	**TQM focuses on** i. Supplier ii. Employee iii. Customer The Correct Answer is a. i only	**b**

	b. ii & iii c. i, ii & iii d. None of the above **Explanation:** A primary focus of **TQM** and most Quality Management Systems is to improve customer satisfaction by having a customer focus and consistently meeting customer expectations	
112	**Process evaluation is to identify** i. Validation of product ii. Potential failure prevention iii. Correctness of product The Correct Answer is a. i only b. i & ii c. ii & iii d. None of the above **Explanation:** A process evaluation focuses on the implementation process and attempts to determine how successfully the project followed the strategy laid out in the logic model.	**c**
113	**Six Sigma is a business-driven, multi-dimensional structured approach to** a. Reducing process variability b. Increasing customer satisfaction c. Lowering Defects & Improving Processes d. All of the above **Explanation: Six Sigma is a business-driven**, **multi-dimensional structured approach** to: Choice-1: Reducing process variability. Choice-2: Increasing customer satisfaction. Choice-3: Lowering Defects.	**d**
114	**Small/Mid-sized Six Sigma projects are executed by professionals titled as:** a. Champion b. Green Belt c. Black Belt d. Site Champion	**b**
115	**Which of the following are examples of Internal Failure costs?** a. Defects and rework b. Inspection and audits c. Warranty and returns d. Purchasing and accounting **Explanation: Examples of internal failure costs are:** **Failure** analysis activities. Product rework **costs**. Product scrapped, net of scrap sales. Throughput lost.	**a**
116	**The main purpose of the measure phase of DMAIC is to** a. Determine the customer requirements b. Find root causes c. Develop solutions d. Set baseline data to understand how the process is currently performing **Explanation: DMAIC** (an acronym for **Define, Measure, Analyze, Improve and Control**) refers to a data-driven improvement cycle used for improving, optimizing	**d**

	and stabilizing business processes and designs.	
117	**What does OEE stand for?**	**a**

	a. Overall Equipment Effectiveness b. Overall Estimation Effectiveness c. Overall Equipment Estimation d. Overall Effective Estimation **Explanation:** OEE (**Overall Equipment Effectiveness**) is a "best practices" metric that identifies the percentage of planned production time that is truly productive.	
118	**The best metric for measuring defectives is:** a. DPMO b. DPU c. PPM d. DPO **Explanation: PPM** defective is one of the simplest metrics in Six Sigma to understand. It refers to the expected number of parts out of one million that you can expect to be defective. It is a measurement used today by many customers to measure the quality performance of their suppliers.	**c**
119	**Which of the following tools is used extensively in quality function deployment?** a. Affinity diagram b. Matrix diagram c. Cause and effect diagram d. Activity network diagram **Explanation:** The House of Quality is an effective tool used to translate the customer wants and needs into product or service design characteristics utilizing a relationship **matrix.** It is usually the first matrix used in the **QFD process.**	**b**
120	**The most important factor for the success of six sigma projects is:** a. Leadership support b. Team support c. Teamwork d. Inter-department harmony **Explanation:** Effective **Six Sigma** management requires commitment and active participation by senior executives, and **leadership** and communications by organizational champions.	**a**
	Unit –V QUALITY SYSTEMS	
121	**The objective of ISO-9000 family of Quality management is** A. Customer satisfaction B. Employee satisfaction C. Skill enhancement D. Environmental issues **Explanation:** The **ISO 9000 family of quality management** systems (QMS) is a set of standards that helps organizations ensure they meet customers satisfaction. So option A is correct	**A**
122	**ISO 14000 quality standard is related with** A. Environmental management systems B. Automotive quality standards C. Eliminating poor quality D. Customer satisfaction **Explanation:**	**B**

	ISO 14000 standards are set of norms for Environmental management systems either at organization process level or product level So option A is correct	
123	**ISO stands for** A. Internal standards and operations B. International specifications organization C. International Standards organization D. None of these are correct **Explanation:** ISO is abbreviated as International Standards organization is an association of national standards bodies of more than 150 countries So option C is correct	**C**
124	**ISO 9001 is not concerned with of quality records** A. Collection B. Maintenance C. Verification D. Dis-positioning **Explanation:** The practices defining the quality records to be maintained in the CMM are distributed throughout the key process areas in the various Activities Performed practices. So option C is correct	**C**
125	**Which of the following requires design control measure, such as holding and recording design reviews and qualification test?** A. CMM B. ISO 9001 C. ISO 9000-3 D. None of the mentioned **Explanation:** ISO 9000-3 states that the supplier should carry out reviews to ensure the requirements are met and design methods are correctly carried out. So option C is correct	**C**
126	**states that, where appropriate, adequate statistical techniques are identified and used to verify the acceptability of process capability and product characteristics.** A. ISO 9001 B. ISO 9000-4 C. CMM D. All of the mentioned **Explanation:** ISO 9001 states that, where, appropriate adequate statistical techniques are identified and used to verify the acceptability of process capability and product characteristics. So option A is correct	**A**

127	**Documents to prepared for quality system** A. 1. Policy 2.Procedures 3.Work Instructions 4. Records B. 1.Products 2.Requirements 3.Performance 4.Processes C. 1.Arrangements 2.Formats 3.Objectives 4.Quality D. 1. Standards 2.Implementation 3.Accredation 4. Purposes. **Explanation:** The documents required for implementing Quality system are 1. Quality Policy manual 2.Quality System Procedures 3.Work Instructions and 4. Records/Formats/Forms	**A**

	So option A is correct	
128	**Types of Audit** A. First Party audit B. Second Party Audit C. Third Party Audit D. All the above **Explanation:** The types of are 1. First Party audit (internal audit) 2. Second Party Audit and 3. Third Party Audit So option D is correct	**D**
129	**NCR abbreviated as** A. Non Conformance report B. National capital Region C. National Cash register D. None of the above **Explanation:** Non Conformance Report ,During ISO certification things do not comply ISO requirements are reported in format of NCR So option A is correct	**A**
130	**ISO 9000 standards are set of norms for** A. Environmental Management System B. Technical Specification form C. Quality Management system D. Independent Examination **Explanation:** **ISO 9000** is defined as a **set** of international **standards** on quality management and quality assurance developed to help companies effectively document the quality system elements needed to maintain an efficient quality system. So option C is correct	**C**
131	**Which of these is the equivalent Indian standard for ISO :8402** A. ISO 9000 B. ISO:13999(as per 1994 version) C.ISO/TS 16949 D.ISO 14000 **Explanation:** The equivalent Indian standard for ISO :8402 is ISO 13999 as per 1994 version So option B is correct	**B**
132	**ISO/TS 16949 standards are standards for** A. Organizational benefits B. Satisfying customer C. Public authorities D. Automotive Quality Management system **Explanation:** **ISO/TS 16949**:2009, in conjunction with **ISO** 9001:2008, defines the quality management system **requirements** for the design and development, production and, when relevant, installation and service of automotive-related products. So option D is correct	**D**

133	**The various product evaluation standards of ISO 14000 are** A. Environmental aspects in product standards B. Environmental Labels and declaration	**D**

	C. Life cycle Assessment D. All the above **Explanation:** The Environmental aspects in product standards, Environmental Labels and declaration , Life cycle Assessment are the standards of ISO 140000 So option D is correct	
134	**The stages of an audit** A. Planning, Performance, Reporting, Follow-up B. Specification, Requirements, System, Quality C. Implementation, Plan, Processes, Document D. Objective, Analysis, Forms, Results **Explanation:** The stages of an audit are 1. Audit planning 2. Audit performance 3. Audit reporting, and 4. Audit follow –up. So option A is correct	**A**
135	**The various organization evolution standards of ISO 14000 series of standards are** A. Environmental Management system B. Environmental Auditing C. Environmental Performance Evaluation D. All the above **Explanation:** The various organization evolution standards of ISO 14000 series of standards are Environmental Management system (EMS), Environmental Auditing (EA), Environmental Performance Evaluation (EPE). So option D is correct	**D**
136	**The benefits realized by implementing an ISO 14000 quality system are** A. Resource benefits, Party benefits B. Global benefits, Organizational benefits C. Public benefits ,Private benefits D. Management benefits, Employee benefits **Explanation:** The benefits realized by implementing an ISO 14000 quality system are Global benefits: To facilitate trade and remove trade barriers to improve environmental performance Organizational benefits: Satisfying customer requirements, Assuring customer of a commitment to EM So option B is correct	**B**
137	**ISO 9000 made up of three core standards they are** A. ISO9001: 9100, ISO 9001: 2008, ISO 9100 : 2008 B.ISO 9000:2005, ISO: 9001:2008, ISO : 9004:2009 C.ISO 9000: 9100, ISO 9000: 2005, ISO: 9000: 2000 D. None of the above **Explanation:** The family of ISO 9000 made up of three core standards • ISO 9000:2005, : QMS : Fundamentals • ISO: 9001:2008, : QMS : Requirements • ISO : 9004:2009 QMS : Guidelines for performance Improvement So option B is correct	**B**

138	**BIS is abbreviated as** A. Body of India standards	**B**

	B. Bureau of Indian Standards C. Basic India standards D. None of the above **Explanation:** BIS (Bureau of Indian Standards) is national standards body of India and is a founder members of ISO So option B is correct	
139	**Which IS/ISO 9000 standard is meant for certification** A. IS/ISO 9001 B. IS/ISO 9004 C. IS/ISO 9100 D. TL 9000 **Explanation:** Any organization can apply for certification against IS/ISO 9001. The other IS/ISO 9000 and IS/ISO 9004 are guidance standards and are not meant for certification. So option A is correct	**A**
140	**The key elements of Audit performance are** A. Schedules, Personnel, Checklist B. Requirements, Assurance, Manuals C. Opening meeting, Audit process, Audit deficiencies D. None of the above **Explanation:** The key elements of Audit performance are Opening meeting: organized to initially brief the auditee about the scope of audit Audit process: run to schedule and should cover entire scope as planned Audit deficiencies: clear and precise discrepancy reports are raised. So option C is correct	**C**
141	**ISO 14000 standards divided into two area they are** A. Organization ,Product Evaluation Standards B. Global , Environmental Standards C. Management, Assessment Standards D. Customer, Public Standards **Explanation:** ISO 14000 standards divided into two area they are Organization standards: the way in which business is to be conducted and govern what is deemed as acceptable behavior in the workplace. Product Evaluation Standards: that lays down the requirements to be accomplished by a product or a group of products to certify its fitness for use. So option A is correct	**A**
142	**Which ISO 14000 standard is meant for certification** A. ISO 14001 B. ISO 14004 C. ISO 9100 D. TS 16949 **Explanation:** ISO 14001 is a contractual standard against which organization are certified.ISO 14004 a non-contractual standard is meant for providing guidance for EMS implementation. So option A is correct	**A**

143	**QS 9000 is set of quality system for** A. Environmental System	**B**

	B. Automotive suppliers C. Management System D. Customer satisfaction **Explanation:** QS 9000 is set of quality system requirements to help automotive suppliers to ensure that they are meeting/exceeding customer requirements So option B is correct	
144	**The purpose of EMS audit is** A. Co-operation with public authorities. B. Management commitment C. To ensure that EMS conforms to plans D. None of the above **Explanation:** The purpose of EMS audit is to ensure that the EMS conforms the plans So option C is correct	**C**
145	**The third party audit is for** A. Organization B. Independent organization C. Customer D. All the above **Explanation:** The third party audit refers to audit by an independent organization on a supplier for accreditation assessment purposes. So option B is correct	**B**
146	**What is the purpose of ISO 9000:2005 in QMS?** A. Fundamental Vocabulary B. Certification C. Customer requirement D. Management **Explanation:** The family of ISO 9000 made up of core standards among that ISO 9000:2005, : Quality Management System : Fundamentals So option A is correct	**A**
147	**What is the purpose of ISO 9001:2008 in QMS?** A. Requirement B. Planning C. Documentation D. Verification **Explanation:** The family of ISO 9000 made up of core standards among that ISO: 9001:2008, : Quality Management System: Requirements So option A is correct	**A**

148	**What is the purpose of ISO 9004:2009 in QMS?** A. Policy B. Review C. Guidelines for performance improvement D. Benefits **Explanation:** The family of ISO 9000 made up of core standards among that ISO : 9004:2009 Quality Management System: Guidelines for performance Improvement	**C**

	So option C is correct	
149	**Why we need Quality Auditing?** A. To verify whether the system is effective and suitable B. To decide about the policy C. To maintain the standards D. For monitoring and measurement purpose **Explanation:** Quality auditing should be carried out in order to verify whether a quality system is effective and suitable. So option A is correct	**A**
150	**The two generic ISO standards are** A.ISO 9001 & ISO 14001 B.ISO 8402 & ISO 13999 C. QS 9000 &TS 16949 D. None of the above **Explanation:** The two generic ISO standards are ISO 9001 : Quality Management system –Requirements ISO 14001: Environmental Management system-specification with guidance for use. Generic standards mean that the same standards can be applied to any organization. So option A is correct	**A**

Tools and Techniques of TQM

151. Which statistical technique integrates product design and manufacturing process?
a) Tree analysis
b) Problem solving techniques
c) Quality function deployment
d) Taguchi approach

Answer: d
Explanation: Taguchi's approach for quality combines statistical methods and engineering to achieve rapid movement in quality and cost by optimising the design of a product. It integrates manufacturing process and product design.

152. What is the key step in Taguchi's approach?
a) Tolerance design
b) System design
c) Parameter design
d) Process design

Answer: c
Explanation: Taguchi's approach is based on integrating system design (initial design stage), parameter design (Testing various material combinations) and tolerance design (buying material of better grade). Parameter design is the key step as it offers the concept of uncontrollable factor.

153. What is called the stratification of information?
a) Breaking down a whole group into smaller sub groups
b) Isolating the vital few from the trivial many
c) Grouping of scattered information
d) Sequencing of processes in a quality system

Answer: a
Explanation: Stratification of information is one of the statistical tools which means breaking down of the whole group into smaller sub-groups. Run charts, effect diagram, pareto diagram and scatter diagrams are also the statistical tools.

154. Which technique is used to relate complex cause and effect relationships?
a) Affinity diagram
b) Pareto diagram
c) Scatter diagram
d) Interrelationship diagram

Answer: d
Explanation: Interrelationship diagram is a quality improvement technique which shows the relationship between inter-related factors. This diagram displays the factors which are involved in complex problems.

155. What is PDPC?
a) A statistical tool
b) Quality improvement technique
c) Quality assurance technique
d) Statistical process control technique

Answer: b
Explanation: PDPC is process decision program chart which helps in the selection of the best process to obtain desired result. It is a quality improvement technique. It evaluates existing process and also look at alternatives.

156. What is the first step in problem solving process?
a) Plan
b) Do
c) Check
d) Action

Answer: a
Explanation: Problems are best solved by the cycle: Plan-Do-Check-Action. In planning, a course of action is planned according to customer requirement and conditions of service then the process must be executed according to this plan.

157. How many control charts are normally used for statistical control of variables?
a) 1
b) 2
c) 3
d) 4

Answer: c
Explanation: Three control charts are normally used for statistical control of variables. These are i) Mean chart, ii) Range chart, and iii) standard deviation charts. Control charts help in the understanding of inherent capability of process and bring the process under control.

158. Which tool is used to analyse the effects of a failure of individual components on the system?
a) FTA
b) FMEA
c) Quality circles
d) Fool proofing

Answer: b
Explanation: Failure mode and effect analysis (FMEA) is a statistical tool used to review the new product design with respect to the requirements of customers before it is sent to production. It is used basically to analyse the failure effect of individual components on the system as a whole.

159. What is the formula for process capability index?
a) $(1-K)C_p$
b) $(1+K)C_p$

c) $(1-C_p)K$
d) $(1+C_p)K$

Answer: a
Explanation: Process capability index is also known as measure of process capability and denoted by C_{pk}. $C_{pk} = (1-K)*C_p$. K is the correction factor and always has a positive value. C_p is the process capability potential also known as process capability variation and is equal to the (Specification width divided by process width).

160. What is arrow diagram in TQM?
a) A diagram used to plan the most appropriate schedule
b) Diagram shows the relationship strength between the variables
c) Used large amount of data and organize it on the basis of natural relationship between items
d) Diagram showing the sequencing and inter relationships between factors

Answer: a
Explanation: Arrow diagram is a statistical tool used to plan the most appropriate schedule for any task and to effectively control it during the progress of the process. Arrow diagram helps in establishing the most suitable plan for a project.