CQE Sample Test #5

1. Good form design for quality information systems (QIS) provides for all of the following EXCEPT
   A. Economy - faster input and sorting.
   B. Validity and timeliness.
   C. Easier usage.
   D. Error avoidance.

2. In a manufacturing process, twenty samples of six units each have an overall average of 1.001 inches. The average of the twenty ranges is 0.002 inch. What are the X-bar chart control limits?
   A. (0.995,1.007)  
   B. (0.999,1.002)  
   C. (0.999,1.003)  
   D. (1.000,1.002)

3. An X bar - R chart with n=5 has been plotted for some time and has demonstrated random variation. Upon review of the last 30 plot points, the expected number of runs around the centerline on the X bar chart is expected to be approximately which of the following?
   A. 4  
   B. 9  
   C. 12  
   D. 16

4. The BEST reason for instituting a quality cost system is
   A. To satisfy ISO 9000 system requirements.
   B. To achieve a proper balance of prevention, appraisal and failure costs.
   C. To identify opportunities for improvement.
   D. To benchmark your competitors.
5. Consider the following quality cost elements for Apex manufacturing
   Inspection salaries 31,000
   Customer deviation requests 17,000
   Procedure writing 2,000
   Field warranty costs 70,000
   Calibration of inspection equipment 3,000
   Quality planning 6,000
   Final product testing 16,000
   Internal rejections 72,000
   Using customary practice, what % of total quality costs are appraisal?

   A. 23.5% B. 25.0% C. 22.6% D. 15.7%

6. The common functions of a quality organization includes a branch which may be defined as:
   "A planned and systematic activity which provides adequate confidence that a product or service will
   conform to requirements." This function can be classified as that of

   A. Quality Control. B. Quality Assurance.
   C. Quality Inspection. D. Reliability.

7. Which of the following would NOT be considered an interpersonal skill ?
   A. Ability to work effectively in a team environment.
   B. Ability to generate supplier quality performance ratings.
   C. Ability to interface effectively with customers.
   D. Ability to communicate and interact with diverse groups.

8. On blueprints, thin lines with arrows at each end and numbers placed near their midpoints, specifying a
   part size, are called
   A. Conversion lines. B. Dimension lines.
   D. Object lines. D. Hidden lines.
9. When any discontinuity is of such size, shape, type and location that it creates substantial chance of material failure in service, it is commonly called which of the following?

10. An electronic control module has a constant failure rate. The probability of this controller surviving for 10,000 hours is 0.8. Given the controller has survived for 5,000 hours, what is the probability of the unit failing before 15,000 hours?
   A. 0.2       B. 0.4       C. 0.6       D. 0.8

11. A process that is normally distributed will have which of the following characteristics?
   A. It is predictable.       B. It is bimodal.       C. It is skewed.       D. It is truncated.

12. Finding the root cause of a nonconformity and applying a remedy, then verifying the effectiveness is

13. A method of improving the performance in any function area of your company including product or service quality would be
   A. Utilizing FTA or FMECA techniques.
   B. Applying the benchmarking process.
   C. Instituting an improved design review procedure.
   D. Reading the Malcolm Baldrige application guidelines.

14. When considering human motivation in solving quality problem, it is most important to recognize that
   A. Individuals have wants and needs.
   B. Individuals have different levels of needs.
   C. Individual motivation is of little concern in quality solving.
   D. All individuals have basic needs.
15. Quality team success is MOST dependent on which of the following?
   A. Team members having full knowledge of the fishbone technique.
   B. Active support by mid-managers.
   C. Policy support by top management.
   D. The facilitator setting strict schedules for ideas.

16. What would occur if the quality goals were NOT a part of the strategic plan?
   A. There would be no strategic goals.
   B. There would not be as much emphasis on quality.
   C. The total quality effort would not suffer.
   D. The quality department would still maintain the quality goals.

17. For employee involvement efforts to succeed, what may be need?
   A. Increased employee incentives.
   B. Increased basic training company wide.
   C. Employee understanding of how they can make a difference.
   D. The initiation of pilot projects.

18. The advantages of a quality cost system would NOT include which of the following items?
   A. Aligns quality and company goals.
   B. Provides a prioritization system for the allocation of resources.
   C. Ensures the resolution of specific quality problems.
   D. Provides a manageable overview of quality.

19. The first and most important project planning step is
   A. Securing resources.
   B. Defining the objective.
   C. Defining the specifications.
   D. Creating the Gantt chart.
20. Work breakdown structure means
A. Project management can only be applied to tearing down buildings, not construction of new structures.
B. The workers have organized and have delayed the project until their demands are met.
C. The project plan has failed due to lack of support by upper management.
D. The statement of work is divided into the detailed listing of activities required to complete the project.

21. Receiving inspection is NOT used when
A. It is too expensive. B. The supplier is part of the same parent company.
C. A JIT program is in place. D. All of the above.

22. When making measurements with test instruments, precision and accuracy mean
A. The same. B. The opposite.
C. Consistency and correctness, respectively. D. Exactness and traceability, respectively.

23. Calibration intervals should be adjusted when
A. No defective product is reported as acceptable due to measurement errors.
B. Few instruments are scrapped during calibration.
C. The results of previous calibrations reflect few "out of tolerance" conditions during calibration.
D. A particular characteristic on the gage is consistently found to be out of tolerance.

24. Precision can BEST be defined as
A. The ability to target a process to a specified normal value.
B. The average reading determined after repeated measurements by different operators.
C. The difference between the average of repeated measurements on the same item.
D. The agreement or closeness of measurements on the same item.
25. Which of the following are exclusively variable gages?

26. A process is producing at a rate of 3% defective. What is the probability of accepting a lot of 2000 parts if a sample of 50 is taken and the lot is rejected when 2 or more rejects are found?
   A. 0.332.  B. 0.2181.  C. 0.4447.  D. 0.5578.

27. The indifference quality level is
   A. The quality level with probability of acceptance = 0.0.
   B. The quality level with probability of acceptance = 1.0.
   C. The quality level with probability of acceptance = 0.5.
   D. The worst acceptable quality level.

28. Using a sample size of 100 and an acceptance number of 1, what is the probability of accepting a lot that is 3% defective?
   A. 0.05  B. 0.20  C. 0.42  D. 0.80

29. In ANSI/ASQ Z1.4 the AQL is always determined at what Pa on the OC curve?
   A. 0.05  B. 0.10  C. 0.90 or 0.95  D. None of the above

30. A sampling plan involves selecting a sample of 50 from a very large lot, and rejecting the lot if 2 or more defects are found. If an incoming lot is 10% defective, what is the probability of rejecting the lot?
   A. 0.6335  B. 0.9987  C. 0.5443  D. 0.9662

31. A lot of 75 parts is inspected to an AQL of 0.25% using normal inspection, single sampling. What is the sample size using ANSI/ASQ Z1.4?
   A. 13  B. 20  C. 32  D. 50
32. A single sampling plan calls for a sample size of 80 with an acceptance number of 5 and a rejection number of 6. If the quality of the submitted lots is ten percent defective, then the percent of lots expected to be accepted in the long run is approximately
   A. 6 %  
   B. 10 %  
   C. 20 %  
   D. 30 %

33. Parts in use during the "wear out" portion of the part life cycle curve will exhibit
   A. A constant failure rate.  
   B. A decreasing failure rate.  
   C. A low failure rate.  
   D. An increasing failure rate.

34. Which of the following is the BEST method to developing materials for education program on the gaps in performance ?
   A. Secure a workshop trainer.  
   B. Review a record of activities.  
   C. Set up a one shot case study.  
   D. Allocate employees for training.

35. Disadvantages of Gantt charts include
   A. They are more complex than bar charts.  
   B. They do not show interdependencies of activities.  
   C. Most project managers prefer PERT charts over Gantt charts.  
   D. Slack times cannot be indicated.

36. The management team is establishing priorities to attack a serious quality problem. You are requested to establish a data collection system to direct this attack. You use which of the general management rules to support your recommendations as to the quantity of data required ?
   I. You compare the incremental cost of additional data with the value of the information obtained and stop when they are equal.
   II. Your decision will correspond to the rules applicable for management decisions in other factors of production.
   III. Your decision is based upon the pure relationship between value and cost.
   A. I  
   B. I , III  
   C. II , III  
   D. I , II , III
37. Good quality information system should
   I. Allow top management to easily view important information.
   II. Collect as much data as possible electronically rather than manually.
   III. Be accessible to all members of the organization.
   A. I  B. I, III  C. II, III  D. I, II, III

38. Quality professional development can be LEAST accomplished by which of the following methods?
   A. Attending quality seminars on pertinent topics.  B. Studying for an ASQ certification examination.
   C. Reading articles in quality journals.  D. Updating your resume from time to time.

39. The management approach MOST supportive of personnel effectiveness is which of the following?
   A. Incorporate as many of the current motivational techniques as possible.
   B. Enforce the philosophy that people are the only asset which can be developed.
   C. Ensure that employees recognize that company objectives take precedent over individual objectives.
   D. Make sure that company employees leave work each day feeling good about themselves.

40. Which of the following criteria would NOT be considered to be an important descriptive factor for most high performance organizations?
   A. Efficiency in manpower allocation and a profit oriented culture.
   B. Knowledgeable management and open communication channels.
   C. Balanced performance results with clear, challenging, corporate goals.
   D. An energized workforce dedicated to quality, improvement and productivity.

41. Which of the following techniques are NOT especially beneficial for the generation of ideas when solving quality and productivity problems?
   A. Poka-yoke.  B. Brainstorming.  C. NGT.  D. PERT.
42. A critical path in a project means that
   A. The project is important to the profits of the organization.
   B. Slack times can be used to delay the ending date of project.
   C. Event on this path have no slack time.
   D. Events on this path delays the starting date of the project.

43. In order to implement a continuous improvement strategy, a company may institute a steering committee or improvement council. Which of the following would generally NOT be a task performed by this council?
   A. The development of a quality vision for the company.
   B. The combined development and implementation of the company improvement strategy.
   C. The definition of certain quality objectives for sections of the company.
   D. The development of quality education and communication modules for the organization.

44. Variables control chart are designed with which of the following objectives?
   A. To reduce sample size.
   B. To fix the risk of accepting poor product.
   C. To decide when to investigate variation.
   D. To establish an acceptance quality level.

45. The BEST definition of the PDCA techniques is which of the following?
   A. A method of involving teams in the problem solving cycle.
   B. An organized mind-mapping technique.
   C. A continuous improvement loop.
   D. A creative planning analysis method.

46. Which of the following is NOT a data presentation aid?
   A. Brainstorming.
   B. Histograms.
   C. Scatter diagrams.
   D. Pareto diagrams.

47. Which of the following quality tools is also a bar chart?
   A. Control Chart.
   B. Ishikawa Diagram.
   C. Pareto Diagram.
   D. Scatter Diagram.
48. Pareto diagrams are used to
   A. Determine a cause-effect relationship between one or more variables.
   B. Focus attention on problems in priority order.
   C. Generate a large number of ideas.
   D. Display cause in a nongraphical manner.

49. As a problem-solving technique, which of the following would be the BEST application for an Ishikawa diagram
   A. Problem identification and corrective action.       B. To support the Plan, Do, Check, Act cycle.

50. A process flow chart is ideal for
   A. Detecting the causes for delays.                  B. Determining defective parts.
   C. Prioritizing problems.                           D. Determining if two variables are related.

51. A problem exists with the labels in the print shop and there is a need for each shift to keep track of the number of defective units. The production rate varies from shift to shift and the customer is demanding that a control chart be implemented. What would be the BEST tool to keep track of the number of defective units?

52. Which of the following is the underlying subgrouping scheme for control charting?
   A. Selected to include a heterogeneous cross section of product produced.
   B. Selected to coincide with customer orders and invoices.
   C. Selected to consist of products produced in tight time sequence.
   D. Selected to match final inspection lots.

53. Which of the following quality improvement tools is MOST clearly customer directed?
54. Which distribution is MOST appropriate for modelling the number of surface defects on a disk drive?

55. The binomial distribution is a discrete distribution and may be used to describe
A. A sampling without replacement from a finite population.
B. The case of n independent trials with probabilities constant from trial to trial.
C. The case of n independent trials with several outcomes for each trial.
D. Sampling without replacement from a finite population where there are several outcomes for each trial.

56. The standard deviation as a percent of the mean is called
A. Relative precision.  B. Coefficient of variation.

57. The hypergeometric distribution is
A. A continuous distribution.
B. Used to describe sampling from a finite population without replacement.
C. The limiting distribution of the sum of several independent discrete random variables.
D. A special case of the Poisson distribution.

58. Statistical techniques do NOT include
A. Frequency distributions.  B. Control charts.
C. Sampling tables.  D. Sorting.
59. The Poisson distribution is
   A. A continuous distribution.
   B. A discrete distribution with its expected value equal to its variance.
   C. Used to describe sampling without replacement from a finite population where there are several outcomes for each trial.
   D. The limiting distribution of the sum of several independent discrete random variables.

60. The distribution of a characteristic is negatively skewed. The sampling distribution of the mean for large samples is
   A. Negatively skewed.  
   B. Approximately normal. 
   C. Positively.  
   D. Lognormal.

61. A statistic is
   A. The solution to a problem.  
   B. A population value. 
   C. A positive number between 0 and 1 inclusive.  
   D. A sample value.

62. The probability of a train arriving on time and leaving on time is 0.8. The probability of the same train arriving on time is 0.84. The probability of this train leaving on time is 0.86. Given the train arrived on time, what is the probability it will leave on time ?
   A. 0.9302  
   B. 0.8434  
   C. 0.8837  
   D. 0.9524

63. Assume a large lot contains exactly 4 percent defective items. Using the Poisson distribution, what is the probability that a random sample of 50 items will NOT reflect the true lot quality ?
   A. 27%  
   B. 73%  
   C. 82%  
   D. 67%

64. A shipment of 1,000 units contains 10% nonconforming items. A random sample of five units is selected from the shipment. The probability that the sample will contain no nonconforming items is
   A. 0.5905  
   B. 0.6070  
   C. 0.0001  
   D. 0.5000
65. In order to test whether the outputs of two machines were yielding the same average value or one was larger than the other, a sample of ten pieces was taken from each. The t-value turned out to be 1.967. Using a level of significance of 0.05, one-tailed test, we conclude that
   A. The obtained t-ratio does not fall within the critical region.
   B. There was no significant difference between the means.
   C. The null hypothesis was rejected.
   D. The null hypothesis was accepted.

66. One use for a student t-test is to determine whether or not differences exists in
   A. Variability.
   B. Confidence intervals.
   C. Correlation coefficients.
   D. Averages.

67. The "least squares method" is used in
   A. The central limit theorem.
   B. Calculating significant few of causes of errors.
   C. Calculating tolerancing assembly parts.
   D. Calculating a best fit regression line.

68. A Latin square design is an experimental design which
   A. Cannot be used when estimation of the interaction effect is desired.
   B. Affords a good estimate of interaction effects.
   C. May not permit all treatments in every block.
   D. May require the need to estimate the parameters during the experimentation.

69. Given a one-way ANOVA, and given the sum of squares for error is 28, the sum of squares between treatments is 86, the mean square error is 7, and the mean square between treatments is 21.5, compute the F-statistic.
   A. 0.45
   B. 3.07
   C. 8.22
   D. 1.302
70. Which of the following is MOST important when calibrating a piece of equipment?
   A. The calibration sticker.       B. The maintenance history card.
   C. The standard used.           D. The calibration interval.

71. Metrology is
   A. The science of measuring.     B. The science of metals.
   C. The science of weather prediction. D. The science of variability.

72. In the establishment of a calibration schedule, which of the following statements apply?
   A. The importance of tool pressure and operator "feel" must be emphasized.
   B. The cleanliness of all tools must be controlled.
   C. A time or usage interval must be established and maintained.
   D. Adequate instruction in the care and operation of the tool is necessary.

73. Measuring and test equipment are normally calibrated to
   A. Comply with federal regulations.       B. Determine and/or assure their precision.
   C. Determine and/or assure their accuracy. D. Check the validity of reference standards.

74. The BEST approach when selecting quality measuring devices is which of the following?
   A. Select those which are automated or can be automated in the future.
   B. Select those which integrate most efficiently with the entire quality system.
   C. Select those that are most inexpensive but will still differentiate between good and bad product.
   D. Select those, even if expensive, that will produce the most useful product.

75. Which of the following are good sources of information on customer satisfaction EXCEPT?
   A. Internal customers.       B. Suppliers.
   C. Upper management.          D. Customers.
76. A quality control program is considered to be
   A. A collection of quality control procedures and guidelines.
   B. A step by step listing of all quality control check points.
   C. A summary of company quality control policies.
   D. A system of activities to provide quality of products and service.

77. In obtaining Total Customer Satisfaction, management should NOT undertake which of the following activities ?
   A. Use and planning of time, manpower and training.
   B. Encourage team competition.
   C. Encourage sacrificing for the team.
   D. Coordinate efforts of the department.

78. A vendor may be audited both before and during the execution of a contract. During such a vendor audit, the focus may be directed at the management of the company. Which of the following areas would be EXCLUDED during such an audit ?
   A. Use and planning of time, manpower and training.
   B. Defined quality responsibilities.
   C. Company philosophy and organizational charts.
   D. Design and process capabilities.

79. What is the highest form of partnering with employees ?
   A. Employee involvement.
   B. Tasks team.
   C. Cost reduction projects.
   D. Stock option plans.

80. Kaizen is a Japanese approach directed toward
   A. Mistake proofing an operation.
   B. Doing things better to achieve an increasingly higher standard.
   C. Developing employee participation in the business decisions.
   D. Becoming more competitive in the world market.
81. If the average repair time for a system is 3 hours and the MTBMA is 122 hours, what is the operational availability?
   A. 0.975
   B. 0.976
   C. 0.982
   D. 0.997

82. In preparing a quality policy concerning a product line for your company you should NOT
   A. Specify the means by which performance is measured.
   B. Develop criteria for identifying risk situations, and specify whose approval is required when there are known risks.
   C. Include procedural matters or ordinary functional responsibilities.
   D. Identify responsibilities for dispositioning defective hardware.

83. A two-way analysis of variance has r levels for one variable and c levels for the second variable with 2 observations per cell. The degree of freedom for interaction is
   A. 2(r)(c)
   B. (r - 1)(c - 1)
   C. rc -1
   D. 2(r -1)(c - 1)

84. The value for t, when making a two-tailed paired t test, with samples of 13 and α=0.05, is
   A. 1.782
   B. 2.179
   C. 2.064
   D. 1.711

85. Determine the 95% confidence interval for a proportion if 6 defectives were found in a sample size of 100 units.
   A. 0.021 ≤ p ≤ 0.099
   B. 0.0135 ≤ p ≤ 0.1065
   C. 0.011 ≤ p ≤ 0.109
   D. 0.0245 ≤ p ≤ 0.0955
86. Which of the following action steps is MOST recommended to change a satisfied product customer into a delighted customer? (A delighted customer won't buy anything but your product)
   A. Exceed the customer's reliability requirements.
   B. Have an exceptionally quick warranty claim system.
   C. Provide an initial cost substantially below your competition.
   D. Consistently exceed the quoted delivery schedule.

87. A vendor quality assurance function has been adopted; which of the following provision would you advise top management to be the LEAST effective?
   A. Product audits
   B. Source inspection.
   C. Certificate of analysis
   D. Certificate of compliance.

88. The MOST important step in vendor certification is to
   A. Obtain copies of the vendor's quality manual.
   B. Familiarize the vendor with quality requirements.
   C. Analyze the vendor's with quality requirements.
   D. Visit the vendor's plant.

89. The purpose of a quality manual is to
   A. Use it as a basis for every quality decision.
   B. Standardize the methods and decisions of a quality department.
   C. Provide written basis for rejection of lots.
   D. Make it possible to handle every situation in exactly the same manner.

90. Which of the following is the BEST definition of configuration management?
   A. The collection of all product information and activities.
   B. A documentation system.
   C. A change order and record keeping system.
   D. A product production management plan.
91. The acceptance of purchased materials on the basis of certificates of conformance provided by suppliers requires
A. Frequent material audits to confirm supplier's measurement system.
B. Purchaser certification of supplier's measuring equipment.
C. Reinspection of a sample from each lot submitted.
D. Verification of supplier data at least once each quarter.

92. Quality policies are principally issued by management to
A. State the position of the company on quality.
B. Ensure people are reminded about quality.
C. Provide detailed instructions in regards to quality.
D. Ensure customer satisfaction.

93. What is(are) the prime purpose(s) of a failure reporting, analysis and corrective action system (FRACAS) ?
I. To determine the root cause of the problem.
II. To record the corrective action taken.
III. To document the problem.
IV. To assure proper product quality.
A. I
B. II, III
C. I, II, III
D. I, II, III, IV

94. Which one of the following does NOT support the prevention philosophy ?
A. Institute good work methods and train to instill quality attitudes.
B. Choose only vendors that offer the lowest prices.
C. Carefully screen employees in the initial hiring process.
D. Eliminate ambiguities in procedures and instructions.

95. Which of the following items would be LEAST likely to be included in a company quality manual ?
A. A nonconforming product element.  
B. The results of customer surveys - good or bad.
C. An internal quality audit policy.  
D. A description of statistical techniques employed.
96. Complaint indices should
   A. Recognize the degree of dissatisfaction as viewed by the customer.
   B. Provide a direct input to corrective action.
   C. Not necessarily be based on field complaints, service calls or dollar values of claims paid.
   D. Ignore life cycle costs.

97. Which of the following items is common audit finding in the documentation area ?
   A. Nonconforming material is not properly segregated.
   B. Inspectors are not using sound sampling plans.
   C. Obsolete drawings are being used.
   D. Test equipment is overdue for calibration.

98. Which of the following would be considered the WEAKEST reason to initiate an audit ?
   A. To compare actual practice to a defined standard.
   B. Follow-up on corrective action.
   C. Identify the root cause of a recent problem.
   D. Verify that a quality system continues to meet requirements.

99. What is the purpose of a quality audit program ?
   A. Catch defects missed by inspection.
   B. Insure that people follow procedures.
   C. Provide a super system for continuous improvement.
   D. Measure and report the effectiveness of the control functions.

100. If minor observation is suitably corrected by the auditee during the course of an audit, it is customarily
    A. Omitted from the exit review.
    B. Included in the exit review but not the written report.
    C. Omitted from both the exit review and written report.
    D. Included in the written report only.
101. Preventive maintenance is characterized by
   I. Replacing failed/defect items as they are found in normal service use.
   II. A planned program of tests, inspections, and/or replacements.
   III. Replacing items just before they fail.

   A. I       B. II      C. I, III    D. I, II, III

102. A pre-award survey of a potential supplier is BEST described as which of the following audits?

103. The quality audit could be used to judge all of the following EXCEPT
   A. A prospective vendor's capability for meeting quality standards.
   B. The adequacy of a current vendor's system for controlling quality.
   C. The application of a specification to a unique situation.
   D. The adequacy of a company's own system for controlling quality.

104. A quality audit program should begin with
   A. A study of the quality documentation system.
   B. An evaluation of the work being performed.
   C. A report listing findings, the action taken, and recommendations.
   D. A charter of policy, objectives, and procedures.

105. Data from which of the following investigations would normally NOT be included in auditing a
     complete quality system?
   A. Examination of all items produced.
   B. Examination of customer needs and the adequacy of design specifications in reflecting these needs.
   C. Examination of vendor product specifications and monitoring procedures.
   D. Examination of customer quality complaints and adequacy of corrective action.
106. The diameter of a population of ball bearings is normally distributed with a mean of 75 and a standard deviation of 8. What is probability of the average diameter of 10 randomly selected ball bearing greater than 77?
A. 0.3751  B. 0.4013  C. 0.2146  D. 0.0210

107. What is the lower control limit for proportion defective if the average daily production is 5000 units and the average fraction defective is 0.02?
A. 0.016  B. 0.014  C. 0  D. 0.010

108. The critical value of the t-distribution is
A. Always greater than the critical value of the normal distribution.
B. Always less than the critical value of the normal distribution.
C. Not related to the critical value of the normal distribution.
D. Approaches the critical value of the normal distribution as the degrees of freedom increase.

109. In planning for quality, an important consideration at the start is
A. The relation of the total cost of quality to the net sales.
B. The establishment of a company quality policy or objective.
C. Deciding precisely how much money is to be spent.
D. The selling of the quality program to top management.

110. Which of the following is NOT a responsibility of the auditor?
A. Prepare a plan and checklist.
B. Report results to those responsible.
C. Investigate deficiencies for cause and define the needed corrective action.
D. Follow up to see if the corrective action was taken.
111. Which of the following techniques would NOT be used in a quality audit?
   A. Select samples only from completed lots.
   B. Examine samples from the viewpoint of a critical customer.
   C. Audit only those items which have caused customer complaints.
   D. Frequency of audits to depend on economic and quality requirements.

112. According to Tchebysheff's theorem what % of measurements must lie within 2.5 standard deviations of the mean?
   A. 3/4
   B. 8/9
   C. 84%
   D. 62.5%

113. What is the standard deviation of the following data?
   3.2, 3.1, 3.3, 3.3, 3.1
   A. 3.2
   B. 0.0894
   C. 0.0675
   D. 0.0498

114. The average number of flaws in large plate glass is .25 per pane. The standard deviation of this poison distribution is
   A. 0.25
   B. 0.05
   C. 0.75
   D. 0.50

115. An R chart is most closely related to a
   A. c chart.
   B. s chart.
   C. u chart.
   D. X bar chart.

116. A control chart is used to
   A. Determine if defective parts are being produced.
   B. Measure process capability.
   C. Determine cause of process variation.
   D. Detect non-random variation in process.
117. The term collinear refers to
A. Two linear variables.  B. A linear interaction.
C. Variables being a linear combination of one another.  D. Linear correlation.

118. In the "Trace Forward" method of auditing, the auditor begins with sales, selects the order(s) of interest, and follows them through the various departments. Which of the following is NOT an advantage of "Trace Forward" auditing?
A. It shows the processing flow through the company.
B. It provides a useful method for training auditors.
C. It is practical for partial audits.
D. It permits quick detection of deficiencies at the front end.

119. When asked to make recommendations on how to correct any deficiencies noted in the exit report, the auditor(s) should
A. Make the best recommendation possible.
B. Confer with the client first.
C. Avoid a recommendation in writing but help the auditee if possible.
D. Offer no specific advice and few suggestions.

120. When planning quality control functions, which one of the following is MOST directly related to production of a quality product?
A. Process control and process capability.  B. Suitable blueprints.
C. Dimensional tolerancing.  D. Product audits.

121. The greatest contribution of a reliability effort is made in the
A. Design area.  B. Manufacturing area.
C. Shipping area.  D. Field service area.
122. In a visual inspection situation, one of the BEST ways to minimize deterioration of the quality level is to
   A. Retrain the inspector frequently.
   B. Have a program of frequent eye exams.
   C. Add variety to the task.
   D. Have a standard to compare against as an element of the operation.

123. Protection against design error is MOST important because of which of the following?
   A. Change control is costly.
   B. It will often go through the entire process undetected.
   C. Design errors have compounding costly effects throughout the system.
   D. Manufacturing departments can't make a quality product if the design is wrong.

124. Follow-up on corrective action requests initiated by the MRB should NOT be conducted by
   A. The individual or department assigned the task.
   B. The Material Review Board.
   C. An upper management review team.
   D. An independent audit team.

125. A design review is conducted for the purpose of
   A. Verifying the details of all the drawings.
   B. Verifying the accuracy of all the specifications.
   C. Verifying workmanship quality of the drawings.
   D. Verifying the completeness and accuracy of the overall design package.

126. An inspection performance audit is made of eight inspectors in an area of complex assembly, all doing similar work. Seven inspectors have an average monthly acceptance rate of 86% to 92%; one inspector has an average rate of 72% with approximately four times the daily variation as the others. As inspection supervisor you should, based on this audit
   A. Promote the 72% inspector since he/she is very conscientious.
   B. Discipline the 72% inspector since he/she is creating needless rework and wasted time.
   C. Initiate a special investigation of inspection and manufacturing performance.
   D. Discipline the other seven inspectors since they are not "cracking down".
127. The task of inspection
   A. Must be performed by a quality organization employee.
   B. Should involve direct measurement of each part produced.
   C. May be performed by the operator who makes the part.
   D. May be eliminated if process control charts are maintained.

128. Which of the following quality management principles would you apply to increase the probability of better quality?
   A. Drawings and specifications should be rigidly set with nominal enforcement.
   B. Drawings and specification should be realistically set with rigid enforcement.
   C. Drawings and specifications should be under the direction of quality engineering.
   D. Drawings and specifications should be rigidly set and rigidly enforced.

129. In the planning of a new major manufacturing program, the greatest quality effort should be put logically in
   A. Inspection of product.       B. Nondestructive testing equipment.

130. The probability of accepting a lot of unacceptable quality is known as
   A. Alpha risk.       B. 1- β       C. Producer’s risk. D. Beta risk.

131. Selecting 4 paint cans from a lot of 20, measuring the weight of each of the 4 cans, and making a decision whether or not to accept the lot based on the average and standard deviation of the obtained weights is an example of
   A. Attributes sampling. B. Go No-Go sampling.
   C. Variables sampling.  D. None of the above.

132. The number of nonconformities per unit is BEST approximated by which of the following distributions?
   A. Binomial.       B. Normal.       C. Hypergeometric D. Poisson
133. Double sampling is better than single sampling because
   A. It is more economical regardless of lot quality.
   B. It is easier to administer and it gives the lot a second chance.
   C. If the first sample rejects the lot, the second will accept it.
   D. It involves less inspection when the lots are of very good or very bad quality.

134. The basic concept of ANSI/ASQ Z1.4 tables and procedures is that
   A. Poor product is accepted infrequently.  B. Good product is accepted rarely.
   C. Poor product is accepted consistently.  D. Good product is accepted most of the time.

135. The acronym "AQL" as used in sampling inspection means
   A. That level of lot quality for which there is a small risk of rejecting the lot.
   B. The best average quality limit.
   C. The maximum percent defective that can be considered satisfactory as a process average.
   D. The quality level that demonstrates the maximum defect rate.

136. A comparison of known sigma and unknown sigma variables sampling plans will show that equal protection is obtained (as determined by the OC curves)
   A. When the unknown sigma sample size is smaller than the known sigma sample size.
   B. When the known sigma sample size is larger than the unknown sigma sample size.
   C. When the known sigma and unknown sigma sample sizes are equal.
   D. When the known sigma sample size is smaller than the unknown sigma sample size.

137. A method of dealing with an inspector, found to be falsifying the results of inspection of borderline product, is to
   A. Criticize the inspector on the basis that the pattern of reading does not follow the law of chance.
   B. Review the procedure for evaluating and reporting borderline product.
   C. Review the inspector's results against the expected results calculated from a normal curve.
   D. Criticize the inspector for not knowing how to read the inspection equipment.
138. Which of the following would NOT typically be considered an essential component of a quality improvement plan?
   A. The transfer of decision making authority to lower levels in the organization.
   B. The support and commitment of upper management.
   C. The development of problem solving skills in all personnel.
   D. The use of outside advice and training.

139. A qualification test is used to determine that design and selected production methods will yield a product that conforms to specification. An acceptance test is used to determine that a completed product conforms to design. On this basis, a destructive test can be used for
   A. Qualification only.       B. Qualification or acceptance.
   C. Acceptance only.        D. Neither qualification nor acceptance.

140. The hazard rate
   A. Is the instantaneous failure rate.
   B. Increases with time.
   C. Is in general, higher for mechanical items than for electrical items.
   D. A constant failure rate.

141. A reliability data system usually implies collecting data on
   C. Maintenance costs.            D. Repair times.

142. The Monte Carlo method refers to a technique for
   A. The simulation of operations when random variations are an essential consideration.
   B. Programming roulette for maximum return.
   C. Random sampling from homogeneous populations.
   D. Establishing quantitative values to unknown restrictive variables in linear programming.
143. Reliability, maintainability, and product safety improvements are MOST often economically accomplished during which of the following phases?
   A. Design and development.   B. Prototype test.
   C. Production.   D. Field operation.

144. For complex electronic systems, the major contributor to repair time is generally
   A. Diagnosis.   B. Disassembly/reassembly.
   C. Remove/replace.   D. Final checkout.

145. Which one of the following will NOT increase reliability in design?
   A. Derating techniques.   B. Design redundancy.
   C. Designing for maintainability.   D. Acceptance testing.

146. A system was designed with 3 capacitors. When the system is first activated all capacitors are operating. The system continues to operate as long as at least 1 capacitor is operating. This is an example of
   A. Redundancy.   B. A series system.
   C. An active parallel system.   D. A standby parallel system.

147. A solid state relay has a constant failure rate of 0.003 per hour. What is the probability of this relay surviving for 100 hours?
   A. 0   B. 0.741   C. 0.671   D. 0.995

148. What is the reliability of a system at 850 hours, if the average usage on the system was 400 hours for 1650 items and the total number of failures was 145? Assume an exponential distribution.
   A. 0%   B. 36%   C. 18%   D. 83%
149. When selecting an audit sample size, which of the following rules should govern your choice?
A. Since quality may change over time, we should look at a fixed quantity each time period for audit purposes.
B. We need only a very small sample for audit purposes, as long as it is chosen at random.
C. Any size sample if randomly selected can be suitable for audit purposes, since we are not directly performing lot acceptance or rejection.
D. ANSI/ASQ Z1.4 is a scientific sampling procedure and we need scientific sampling for audit purposes.

150. A vendor quality survey
A. Is used to predict whether a potential vendor can meet quality requirements.
B. Is an audit of a vendor's product for a designated period of time.
C. Is always conducted by quality control personnel.
D. Eliminates the need for receiving inspection of the surveyed product.

151. Which of the following is NOT a legitimate audit function?
A. Identify the function responsible for primary control and corrective action.
B. Provide no surprises.
C. Provide data on worker performance for punitive action by supervision.
D. Contribute to a reduction in quality cost.

152. It is generally considered desirable that quality audit reports be
A. Stated in terms different from those of the function being audited.
B. Simple but complete.
C. Sent to the general manager in all cases.
D. Quantitative in all cases.

153. Product quality audits
A. Are always useful.
B. Are based on statistically sound sampling.
C. Can be used in place of a sampling plan.
D. Should be customer oriented.
154. Inspection operations typically
   A. Help in assuring satisfactory quality.   B. Reduce the usability of the product or service involved.
   C. Require precise equipment in most instances.   D. Occur between all manufacturing operators.

155. Which of the following would NOT be considered as part detailed inspection instructions ?
   A. Whether the product or service conform to specifications.
   B. What records must be kept.
   C. What must be done with non-acceptable parts.
   D. What are the applicable standards.

156. Specifying a tolerance by +0.000" -0.001", is known as
   A. Bilateral tolerancing.   B. Limit dimensioning.

157. A fundamental step in the establishment of strategic quality management is
   A. Making sure that the quality organization reports to the Chief Executive.
   B. Surveying customers to determine their level of satisfaction.
   C. The formation of team to implement continuous improvement.
   D. The creation of a quality council(committee, advisory board, etc.).

158. Which of the following is NOT considered a prevention cost ?
   A. Writing operation procedures.   B. Training.
   C. Data acquisition and analysis.   D. Calibration test equipment.

159. Which of the following is a preventive action ?
   A. Expanding or rewriting a procedure after it has been found to be ineffective.
   B. Correcting tolerances after they were found to be wrong.
   C. Retraining workers on how to do a task after mistakes were found.
   D. Writing an inspection for a new product.
160. What type of data contains infinite data points that may be displayed on a continuous measurement scale?

A. Continuous distribution.  
B. Statistics.  
C. Parameters.  
D. Discrete distribution.
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Solution #5