

- was 1.00 mm. The dimension of the part is 70 ± 2.5 mm. Parts above 72.5 mm can be reworked but parts below 67.5 mm have to be scrapped. What should be the setting of the process to ensure production of no scrap and to minimize the rework?
- (a) 68.5 mm (b) 70 mm
(c) 70.5 mm (d) 72.5 mm
- 64.** An Operating Characteristics curve (OC curve) is a plot between
- (a) consumers' risk and producers' risk
(b) probability of acceptance and probability of rejection
(c) percentage of defective and probability of acceptance
(d) Average outgoing quality and probability of acceptance
- 65.** The word kanban is most appropriately associated with
- (a) economic order quantity
(b) just-in-time production
(c) capacity planning
(d) product design
- 66.** An item can be purchased for Rs. 100. The cost is Rs. 200 and the inventory carrying cost is 10% of the item cost per annum. If the annual demand is 4000 units, then economic order quantity (in units) is :
- (a) 50 (b) 100
(c) 200 (d) 400
- 67.** Classifying item in A, B and C categories for selective control in inventory management is done by arranging item in the decreasing order of :
- (a) Total inventory cost
(b) Item value
(c) Annual usage value
(d) Item demand
- 68.** Which of the following steps would lead to interchangeability ?
- (a) Process planning
(b) Product design
(c) Operator training
(d) Quality control and standardisation
- 69.** In a weaving operation, the parameter to be controlled is the number of defects per 10 square yards of material. Control chart appropriate for this task is :
- (a) P-Chart (b) C-Chart
(c) R-Chart (d) X-Chart
- 70.** Process capability of a machine is defined as the capability of the machine to :
- (a) Produce a definite volume of work per minute
(b) perform definite number of operations
(c) Produce job at a definite spectrum of speed
(d) Hold a definite spectrum of tolerances and surface finish
- 71.** Match List-I with List-II and select the correct answer using the codes given below the list :
- List-I**
- A. OC curve
B. AOQL
C. Binomial distribution
D. Normal Curve
- List-II**
1. Acceptance Sampling
2. Dodge Roming Table
3. P-Chart
4. Control charts for variables
- | | A | B | C | D |
|-----|---|---|---|---|
| (a) | 1 | 2 | 3 | 4 |
| (b) | 1 | 3 | 2 | 4 |
| (c) | 4 | 2 | 3 | 1 |
| (d) | 4 | 3 | 2 | 1 |
- 72.** Match List-1 (Scientists) with List-II (Research work) and select the correct answer using the codes given below the Lists :
- | List-II | List-II |
|----------------|-------------------|
| A. Shewhart | 1. PDCA cycle |
| B. Taguchi | 2. Quality circle |
| C. Ishikawa | 3. Loss function |
| D. Deming | 4. Control charts |

41. (d) Six sigma aims to control processes by getting them under control. Controlling the variation inherent in a process is the best way to do that. Once we have variation in control we can improve the quality.

52. (b) FMEA is a reliability planning test

60. (b)
$$\begin{aligned} (R)_{\text{sys}} &= R_1 \times R_2 \\ &= (1 - 0.8) \times (1 - 0.8) \\ &= 0.2 \times 0.2 \\ &= 0.04 = 4\% \end{aligned}$$

66. (d)
$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2DC_0}{C_h}} \\ &= \sqrt{\frac{2 \times 4000 \times 200}{0.1 \times 100}} \\ &= 4000 \end{aligned}$$

76. (a)
$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2DC_0}{C_c}} \\ \text{EOQ}' &= \sqrt{\frac{2(2D) \times \frac{C_0}{2}}{C_c}} \\ &= \sqrt{\frac{2DC_0}{C_c}} = \text{EOQ} \end{aligned}$$

84. (d) Large inventory of materials, tools are required at all levels of production hence inventory cost is high.

86. (b) Benchmarking is a quality improvement tool to improve the performance of an organization by comparing the practices of a successful organization.

87. (d) Loss coefficient (k) = 6
Maximum loss permissible

$$\begin{aligned} L(x) &= 96 \\ x &= \text{measured value} \\ t &= \text{target value} \\ L(x) &= K(x - t)^2 \text{ [Taguchi loss function]} \end{aligned}$$

$$\begin{aligned} (x - t) &= \sqrt{\frac{L(x)}{k}} \\ &= \sqrt{96/6} = 4 \end{aligned}$$

88. (c) As the number of sampling plan increases chances of moving error and average number of units inspected decreases.

89. (c) The main objective of quality circle is to improve the quality, productivity, safety and cost reduction, to encourage team spirit, cohesive culture among different levels and sections of the employees.

90. (b) Extrinsic audit carried out by an independent third party that may be accredited, using a national or international standard such as ISO 9000 series to provide assurance on the effectiveness of the quality system

91. (d) In value Engineering
Value of the product
$$= \frac{\text{Function or quality or performance}}{\text{Cost}}$$

92. (a) Mean time between failure (MTBF) = 3000 hours

Mean time to repair (MTTR) = 60 hours

So, Availability =
$$\frac{\text{MTBF}}{\text{MTBF} + \text{MTTR}} = \frac{3000}{3000 + 60} = 0.98$$

93. (c) R-chart used to monitor the amount of dispersion in a sample.

94. (a)
$$\begin{aligned} (\text{Availability})_M &= \left(\frac{\text{MTBF}}{\text{MTBF} + \text{MTTR}} \right)_M \\ &= \frac{70}{70 + 4} = 0.94 \end{aligned}$$

$$\begin{aligned} (\text{Availability})_N &= \left(\frac{\text{MTBF}}{\text{MTBF} + \text{MTTR}} \right)_N \\ &= \frac{58}{58 + 2} = \frac{58}{60} = 0.96 \end{aligned}$$

An availability of machine N is 0.96, which is close to 96% so the company should purchase the model N.

95. (a) When set up cost has taken place internally, it is called ordering cost and is a part of replenishment cost