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**Escuela Superior Politécnica del Litoral**

**Instituto de Ciencias Matemáticas**

**Ingeniería en Auditoria y Control de Gestión**

**Examen de Primera Evaluación**

**Ingeniería de la Calidad.**

**13 de Diciembre del 2010**

**Nombre: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. Mencione y describa tres Normas de Calidad.
2. Escriba cuatro requisitos de un Sistema de Gestión de Calidad.
3. Defina con sus propias palabras “Herramientas de Control de Calidad” y mencione cinco.
4. ¿Qué es y cuando se usa un diagrama de Causa y Efecto?
5. Mencione los principales aportes a la Calidad de Shigeo Shingo.
6. ¿Explique qué relación tienen las herramientas del Control de Calidad con los Principios de Calidad?
7. Una analista de calidad está revisando la capacidad de un proceso relacionado con la producción de montantes, específicamente, la cantidad de fuerza de torsión que se aplica para apretar un sujetador. Se tomaron 25 muestras de tamaño 4 y se utilizaron gráficas . Se conoce que  y que los límites de especificación son  Si el proceso está bajo control estadístico, determine la capacidad del proceso y el índice de capacidad de proceso.
8. En el rectificado de precisión de una parte complicada, es más económico reelaborar esa parte que desecharla. Por ello se decidió definir el porcentaje de piezas reelaboradas en 12,5%. Suponiendo una distribución normal de los datos, que la desviación estándar es de 0,01mm y el límite de especificación superior es de 25,38mm, calcule el centro del proceso.

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| **FACTORES PARA GRÁFICAS DE CONTROL** |
|  n  | Factor A2  | Factor D3  | Factor D4 | factor d2 |
| 2 | 1.880 | 0 | 3,267 | 1,128 |
| 3 | 1.023 | 0 | 2,574 | 1,693 |
| 4 | 0,729 | 0 | 2,282 | 2,059 |
| 5 | 0,577 | 0 | 2,114 | 2,326 |
| 6 | 0,483 | 0 | 2,004 | 2,534 |
| 7 | 0,419 | 0,076 | 1,924 | 2,704 |



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Z** | **0.00**  | **0.01**  | **0.02**  | **0.03**  | **0.04**  | **0.05**  | **0.06**  | **0.07**  | **0.08**  | **0.09** |
| **0.0**  | 0.5000  | 0.5040  | 0.5080  | 0.5120  | 0.5160  | 0.5199  | 0.5239  | 0.5279  | 0.5319  | 0.5359 |
| **0.1**  | 0.5398  | 0.5438  | 0.5478  | 0.5517  | 0.5557  | 0.5596  | 0.5636  | 0.5675  | 0.5714  | 0.5753 |
| **0.2**  | 0.5793  | 0.5832  | 0.5871  | 0.5910  | 0.5948  | 0.5987  | 0.6026  | 0.6064  | 0.6103  | 0.6141 |
| **0.3**  | 0.6179  | 0.6217  | 0.6255  | 0.6293  | 0.6331  | 0.6368  | 0.6406  | 0.6443  | 0.6480  | 0.6517 |
| **0.4**  | 0.6554  | 0.6591  | 0.6628  | 0.6664  | 0.6700  | 0.6736  | 0.6772  | 0.6808  | 0.6844  | 0.6879 |
| **0.5**  | 0.6915  | 0.6950  | 0.6985  | 0.7019  | 0.7054  | 0.7088  | 0.7123  | 0.7157  | 0.7190  | 0.7224 |
| **0.6**  | 0.7257  | 0.7291  | 0.7324  | 0.7357  | 0.7389  | 0.7422  | 0.7454  | 0.7486  | 0.7517  | 0.7549 |
| **0.7**  | 0.7580  | 0.7611  | 0.7642  | 0.7673  | 0.7704  | 0.7734  | 0.7764  | 0.7794  | 0.7823  | 0.7852 |
| **0.8**  | 0.7881  | 0.7910  | 0.7939  | 0.7967  | 0.7995  | 0.8023  | 0.8051  | 0.8078  | 0.8106  | 0.8133 |
| **0.9**  | 0.8159  | 0.8186  | 0.8212  | 0.8238  | 0.8264  | 0.8289  | 0.8315  | 0.8340  | 0.8365  | 0.8389 |
| **1.0**  | 0.8413  | 0.8438  | 0.8461  | 0.8485  | 0.8508  | 0.8531  | 0.8554  | 0.8577  | 0.8599  | 0.8621 |
| **1.1**  | 0.8643  | 0.8665  | 0.8686  | 0.8708  | 0.8729  | 0.8749  | 0.8770  | 0.8790  | 0.8810  | 0.8830 |
| **1.2**  | 0.8849  | 0.8869  | 0.8888  | 0.8907  | 0.8925  | 0.8944  | 0.8962  | 0.8980  | 0.8997  | 0.9015 |
| **1.3**  | 0.9032  | 0.9049  | 0.9066  | 0.9082  | 0.9099  | 0.9115  | 0.9131  | 0.9147  | 0.9162  | 0.9177 |
| **1.4**  | 0.9192  | 0.9207  | 0.9222  | 0.9236  | 0.9251  | 0.9265  | 0.9279  | 0.9292  | 0.9306  | 0.9319 |
| **1.5**  | 0.9332  | 0.9345  | 0.9357  | 0.9370  | 0.9382  | 0.9394  | 0.9406  | 0.9418  | 0.9429  | 0.9441 |
| **1.6**  | 0.9452  | 0.9463  | 0.9474  | 0.9484  | 0.9495  | 0.9505  | 0.9515  | 0.9525  | 0.9535  | 0.9545 |
| **1.7**  | 0.9554  | 0.9564  | 0.9573  | 0.9582  | 0.9591  | 0.9599  | 0.9608  | 0.9616  | 0.9625  | 0.9633 |
| **1.8**  | 0.9641  | 0.9649  | 0.9656  | 0.9664  | 0.9671  | 0.9678  | 0.9686  | 0.9693  | 0.9699  | 0.9706 |
| **1.9**  | 0.9713  | 0.9719  | 0.9726  | 0.9732  | 0.9738  | 0.9744  | 0.9750  | 0.9756  | 0.9761  | 0.9767 |
| **2.0**  | 0.9772  | 0.9778  | 0.9783  | 0.9788  | 0.9793  | 0.9798  | 0.9803  | 0.9808  | 0.9812  | 0.9817 |
| **2.1**  | 0.9821  | 0.9826  | 0.9830  | 0.9834  | 0.9838  | 0.9842  | 0.9846  | 0.9850  | 0.9854  | 0.9857 |
| **2.2**  | 0.9861  | 0.9864  | 0.9868  | 0.9871  | 0.9875  | 0.9878  | 0.9881  | 0.9884  | 0.9887  | 0.9890 |
| **2.3**  | 0.9893  | 0.9896  | 0.9898  | 0.9901  | 0.9904  | 0.9906  | 0.9909  | 0.9911  | 0.9913  | 0.9916 |
| **2.4**  | 0.9918  | 0.9920  | 0.9922  | 0.9925  | 0.9927  | 0.9929  | 0.9931  | 0.9932  | 0.9934  | 0.9936 |
| **2.5**  | 0.9938  | 0.9940  | 0.9941  | 0.9943  | 0.9945  | 0.9946  | 0.9948  | 0.9949  | 0.9951  | 0.9952 |
| **2.6**  | 0.9953  | 0.9955  | 0.9956  | 0.9957  | 0.9959  | 0.9960  | 0.9961  | 0.9962  | 0.9963  | 0.9964 |
| **2.7**  | 0.9965  | 0.9966  | 0.9967  | 0.9968  | 0.9969  | 0.9970  | 0.9971  | 0.9972  | 0.9973  | 0.9974 |
| **2.8**  | 0.9974  | 0.9975  | 0.9976  | 0.9977  | 0.9977  | 0.9978  | 0.9979  | 0.9979  | 0.9980  | 0.9981 |
| **2.9**  | 0.9981  | 0.9982  | 0.9982  | 0.9983  | 0.9984  | 0.9984  | 0.9985  | 0.9985  | 0.9986  | 0.9986 |
| **3.0**  | 0.9987  | 0.9987  | 0.9987  | 0.9988  | 0.9988  | 0.9989  | 0.9989  | 0.9989  | 0.9990  | 0.9990 |
| **3.1**  | 0.9990  | 0.9991  | 0.9991  | 0.9991  | 0.9992  | 0.9992  | 0.9992  | 0.9992  | 0.9993  | 0.9993 |
| **3.2**  | 0.9993  | 0.9993  | 0.9994  | 0.9994  | 0.9994  | 0.9994  | 0.9994  | 0.9995  | 0.9995  | 0.9995 |
| **3.3**  | 0.9995  | 0.9995  | 0.9995  | 0.9996  | 0.9996  | 0.9996  | 0.9996  | 0.9996  | 0.9996  | 0.9997 |
| **3.4**  | 0.9997  | 0.9997  | 0.9997  | 0.9997  | 0.9997  | 0.9997  | 0.9997  | 0.9997  | 0.9997  | 0.9998 |
| **3.5**  | 0.9998  | 0.9998  | 0.9998  | 0.9998  | 0.9998  | 0.9998  | 0.9998  | 0.9998  | 0.9998  | 0.9998 |
| **3.6**  | 0.9998  | 0.9998  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999 |
| **3.7**  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999  | 0.9999 |