

**Las preguntas 1 a 5 serán calificadas sobre 5 puntos**

**Escuela Superior Politécnica del Litoral**

**Instituto de Ciencias Matemáticas**

**Ingeniería en Auditoria y Control de Gestión**

**Examen de Primera Evaluación**

**Ingeniería de la Calidad.**

**4 de febrero del 2011**

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

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1. ¿Cuáles son las semejanzas y cuales las diferencias entre los premios y las certificaciones de calidad?
2. ¿Para qué y cómo se usa un diagrama de afinidad?
3. ¿Qué herramientas del control de calidad se relacionan con la fase DO del círculo de Deming?
4. ¿Qué consideraciones deben hacerse en el paso2 del “método de los siete pasos para mejora reactiva”?
5. Basado en la experiencia obtenida en la visita técnica. ¿Qué percepción tiene acerca de los sistemas de calidad?
6. Se realizaron experimentos en 4 condiciones diferentes para determinar la posible” influencia de las mismas sobre el rendimiento de una reacción química”. Los resultados obtenidos en % son:

|  |  |
| --- | --- |
| **Replica** | **Condiciones experimentales** |
| **I** | **II** | **III** | **IV** |
| 1 | 10 | 9 | 10 | 5 |
| 2 | 11 | 10 | 11 | 6 |
| 3 | 10 | 8 | 10 | 7 |
| 4 | 12 | 11 | 10 | 6 |
| 5 | 12 | 11 | 9 | 8 |

 Realice una prueba para aceptar o rechazar tal hipótesis con el 95% de confianza. **(10 puntos)**

1. La longitud de una determinada pieza debe estar comprendida entre 98 y 101.5 mm.

Cuando el proceso de fabricación está bajo control la longitud de esta pieza se distribuye según una normal N(99.8, 0.5) mm. Actualmente se está controlando el proceso mediante un gráfico X tomado 3 piezas cada 10 minutos. El proceso fabrica 1 pieza cada tres segundos. Calcule:

1. El ATS para detectar un cambio en el proceso, cambiando la nueva media a 100.7 mm.
2. El porcentaje de defectuosas cuando el proceso está fuera de control.
3. El promedio de piezas defectuosas fabricadas hasta que se detecta esta salida de control. **(15 puntos)**

Tabla de valores F para un nivel de confianza del 95%





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| --- |
|  |



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 |