Pre/Post Assessment Response Sheet Name _____ Date _____

Directions: Circle the letter below that best completes each of the statements on the following pages. Record all responses on this sheet; do not write on the following pages.

Pre

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
16.	a	b	c	d
17.	a	b	c	d
18.	a	b	c	d
19.	a	b	c	d
20.	a	b	c	d
21.	a	b	c	d
22.	a	b	c	d
23.	a	b	c	d
24.	a	b	c	d
25.	a	b	c	d
26.	a	b	c	d
27.	a	b	c	d
28.	a	b	c	d
29.	a	b	c	d
30.	a	b	c	d

Post

1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
16.	a	b	c	d
17.	a	b	c	d
18.	a	b	c	d
19.	a	b	c	d
20.	a	b	c	d
21.	a	b	c	d
22.	a	b	c	d
23.	a	b	c	d
24.	a	b	c	d
25.	a	b	c	d
26.	a	b	c	d
27.	a	b	c	d
28.	a	b	c	d
29.	a	b	c	d
30.	a	b	c	d

1. The major difference between a run chart and a control chart is that a run chart does not have _____.
   a. spec limits
   b. sigma limits
   c. defect limits
   d. control limits

2. Of the two types of data that can be collected _____ is more valuable than _____.
   a. common; special
   b. tensile; torsion
   c. defects; defectives
   d. variable; attribute

3. A control chart will demonstrate statistical _____.
   a. capability
   b. kurtosis
   c. significance
   d. stability

4. If a process has a standard deviation of 0.01, a mean of 86.06, and a specification of 86.0+/-0.1, the Cpk is _____.
   a. 1.00
   b. 1.33
   c. 1.67
   d. 1.84

5. If the process in question 4 requires a Cpk of 2.0, by how much must the process mean be shifted toward the target _____.
   a. 0.007
   b. 0.013
   c. 0.015
   d. 0.020

6. What is referred to as “six sigma” quality is equivalent to a Cp of _____ and a Cpk of _____.
   a. 2; 1.5
   b. 6; 5
   c. 5.15; 4
   d. 6; 5.15

7. In the series of data (6, 4, 5, 5, 7, 9), _____ is the range and _____ is the mean.
   a. 5; 6
   b. 5.5; 6
   c. 6; 5
   d. 6.5; 6

8. In the series of data (6, 4, 5, 5, 7, 9), _____ is the sample standard deviation.
   a. 1.63
   b. 1.71
   c. 1.79
   d. 1.80

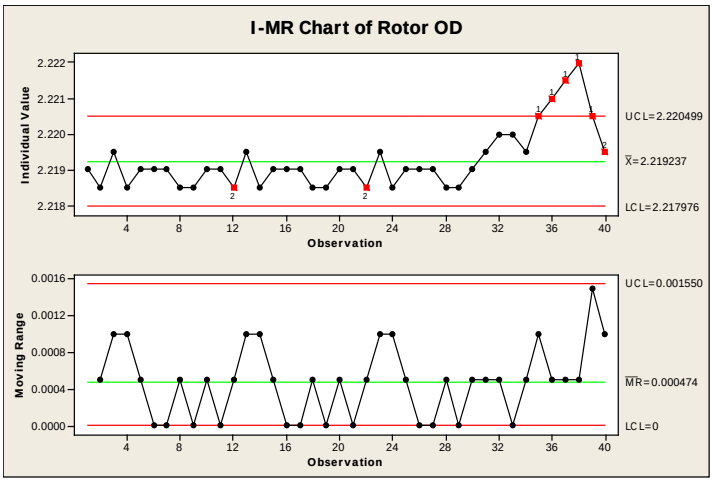
9. _____ distributions are typically bell shaped and symmetric around the mean.
   a. Loss function
   b. Lognormal
   c. Normal
   d. Truncated

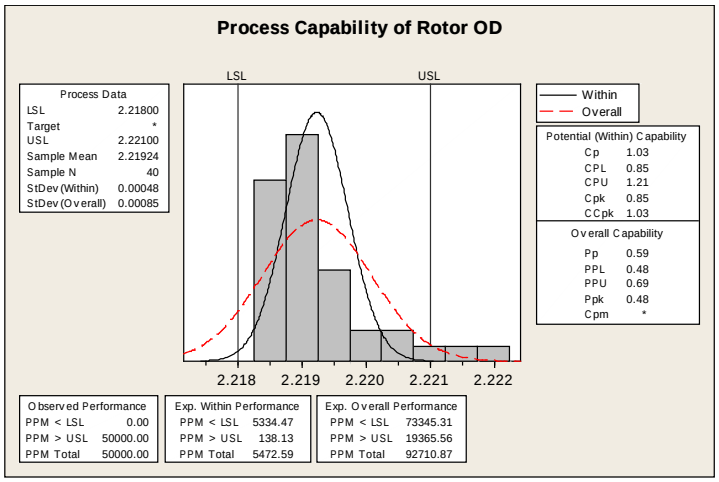
10. Mean, median, and mode are measures of _____ _____.
    a. dispersion deviation
    b. standard deviation
    c. central tendency
    d. arithmetic average

11. Range and standard deviation are measures of _____.
    a. variety
    b. frequency
    c. estimation
    d. dispersion

12. Before a Gage R&R study is performed it is assumed that the gage has acceptable _____ and _____.
    a. repeatability; reproducibility
    b. bias; stability
    c. linearity; popularity
    d. discrimination; predictability

13. The one tail z value (or sigma) for a process with a Cpk of 1 is _____.
    a. 2.8
    b. 3.0
    c. 4.5
    d. 6.0





14. The control chart above show symptoms of _____ but the histogram is _____.
    a. special cause variation; normal
    b. inadequate discrimination; skewed
    c. an out-of-control process; bell-shaped
    d. variable data; in spec

15. The Ppk value in the graphic above is less than the Cpk value because it is based on _____.
    a. a smaller standard deviation
    b. a larger standard deviation
    c. an incorrectly calculated standard deviation
    d. an equal bilateral tolerance

16. The control limits in the upper graphic of the control chart represent _____.
    a. +/- 3 sigma
    b. +/- tolerance limits
    c. +/- 3 standard deviations
    d. both a. and c.

17. The control chart above shows that the process does not have adequate statistical _____.
    a. capability
    b. kurtosis
    c. proximity
    d. stability

18. The control chart above shows evidence of _____ cause variation.
    a. special
    b. common
    c. root
    d. both a. and b.

19. If Cpk is calculated based on the data shown in the histogram above, the results will be _____.
    a. incapable
    b. valid
    c. skewed
    d. inaccurate

20. In addition to the two charts above, a _____ can be used to check for _____.
    a. histogram; consistency
    b. control chart; validity
    c. probability plot; normality
    d. run chart; stability

21. An essential companion tool to the control chart that might help identify the root cause of the instability is a _____.
    a. branch
    b. tree
    c. leaf
    d. log

22. If the special cause for the out-of-control points can be identified and corrected, the _____ should be recalculate after eliminating the out-of-control points.
    a. control limits
    b. mean and standard deviation
    c. capability indices
    d. all of the above

23. 10 consecutive points within +/- 1 sigma of the centerline may mean _____.
    a. the process has improved
    b. the process is statistically out of control
    c. the data has been tampered with
    d. all of the above

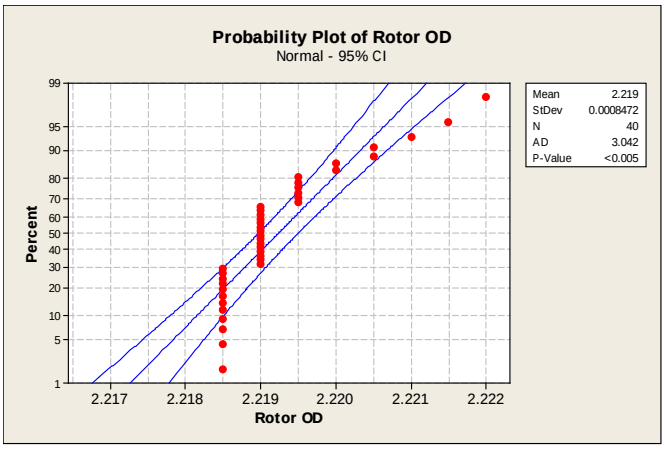
24. For one-sided specification such as flatness, runout, and perpendicularity where the target specification is zero, the Cpk should be equivalent to the _____.
    a. Cpl
    b. Cpu
    c. Cp
    d. Pp

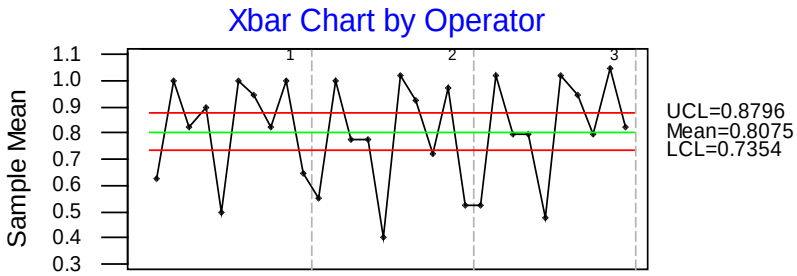
25. Sampling strategies should be based on the ability to detect _____.
    a. special cause variation
    b. mean averages
    c. standard deviation
    d. standard process variation

26. Sampling strategies should be based on _____ as appropriate based on their potential risk for causing and likelihood of detecting abnormal variation.
    a. events (startup, shutdown, changeover)
    b. periods of time (hours or days of operation)
    c. production volume (number of parts made, number of machine cycles)
    d. all of the above

27. The Gage R&R should ideally be _____ of the _____.
    a. 10%; tolerance
    b. 5%; study error
    c. <10%; 6 sigma process variation
    d. both a. and b.

28. A high Gage R&R percentage may be acceptable if the overall process _____ is _____.
    a. average; centered
    b. standard deviation; within tolerance
    c. stability; normal
    d. capability; high





29. In the probability plot above the pattern of points shows that the distribution is _____.
    a. normal
    b. in control
    c. skewed
    d. both a. and b.

30. The average chart above from a Gage R&R study shows that _____.
    a. the process is “out of control”
    b. the “noise” of the measurement system error is less than the “signal” of the part-to-part variation
    c. the operators require additional training on the measurement system
    d. both a. and c.