

1.) A variation caused by the system is \_\_\_\_\_.

- a. special cause variation.
- b. common cause variation.**
- c. assignable cause variation.
- d. All of these

2.) What was the purpose of Deming while using the red bead experiment?

- a. To teach that most of the variation in a system is common cause variation.**
- b. None of these
- c. To teach that the variation caused by the system is equally distributed across a group of workers.
- d. To teach that most of the variation in a system is assignable cause variation.

3.) What is the crucial aspect of strategic thinking ?

- a. All of these
- b. short term planning
- c. predicting the future
- d. *constructing the future***

4.) Who emphasized the importance of a 'systems' approach to manufacturing?

- a. Taiichi Ohno
- b. Walter A. Shewhart
- c. *Peter Drucker***

d. Dr. W. Edwards Deming

5.) How many kinds of flows does manufacturing activity is composed of ?

- a. 4.0
- b. 3.0**
- c. 2.0
- d. 5.0

6.) Which principle or technique is considered as the base platform for TPM?

- a. Kaizen
- b. SMED
- c. Six Sigma
- d. 5S**

Solution Explanation

The traditional approach to TPM was developed in the 1960s and consists of 5S as a foundation and eight supporting activities also called as pillars.

7.) Which of the given situations would minimize type I errors?

- a. Use budget comparisons against actual results without using the concept of SPC.
- b. Use SPC charts where the limits are based on 3 standard deviations.**
- c. Use SPC charts where the limits are based on 2 standard deviations.
- d. Use SPC charts where the limits are based on 1 standard deviation.

8.) How many attributes does WCM readiness is measured in, as per survey by Sastry

- a. 5.0
- b. 6.0
- c. 4.0
- d. 3.0**

9.) Who triggers demand in a 'pull system' ?

- a. Production manager
- b. Next operation**
- c. Sales Personnel
- d. Production planning Personnel

10.) What is the application area for cross-functional teams ?

- a. improve the service-profit chain
- b. All of these**
- c. develop new products
- d. implement new technologies throughout organization

11.) On which of the following distribution is the C-charts based on?

- a. Binomial distribution
- b. Erlang distribution

*c. Poisson distribution*

d. Normal distribution.

12.) The variations resulting from common causes are attributed to

\_\_\_\_\_.

*a. an in control situation which should not be investigated.*

b. an in control situation which should be investigated.

c. an out of control situation which should not be investigated.

d. an out of control situation which should be investigated.

13.) Which manufacturing challenge is the response of a system to environmental uncertainties?

a. time-based competition

*b. Flexibility*

c. quicker customer response

d. Responsiveness

14.) What will be the availability factor under TPM for a shift of 8 hours, 30 minute break and no down time?

a. 0.5

b. 0.75

*c. 1.0*

d. 1.5

Solution Explanation

As there is no down time hence, the availability factor under TPM for a shift of 8 hours, 30 minute break is 100%

15.) Let us consider twenty samples of size 100. Such that total number of defective items is 75. What is the UCL of the 3-sigma ( $z=3$ ) p-chart?

- a. 0.0375
- b. 0.094**
- c. 0.165
- d. 0.793

16.) Which product and process design tool subject models to Finite Element Analysis ?

- a. CAD
- b. CAE**
- c. JIT
- d. PDM

17.) Who is largely attributed to developing World-Class manufacturing ?

- a. Dr. W. Edwards Deming
- b. Walter A. Shewhart
- c. Philip Crosby
- d. Taiichi Ohno**

18.) Which chart is used with limited data, such as when production rates are slow, testing costs are very high, or there is a high level of uncertainty relative to future projects?

- a. Median ( $\bar{X}$ -tilde and R) Chart
- b. X-MR Chart
- c. *Moving Range***
- d. np

19.) Which approach to manufacturing was listed by Hall for excellence?

- a. *All of these***
- b. Value-added manufacturing
- c. JIT
- d. Continuous improvement manufacturing

20.) According to the SPC methodology, when is a system said to be stable?

- a. the mean and range of variation caused by the system are controllable.
- b. *the mean and range of variation caused by the system are predictable.***
- c. the performance of the system is improving.
- d. the system is efficient.

21.) What is the first step in the five-step framework for manufacturing strategy formulation by Hill?

- a. Assess how different products qualify in their respective markets to win orders against competitors
- b. *Define corporate objectives***
- c. Determine marketing strategies
- d. Establish the most appropriate process to manufacture these products

22.) Reboot Pvt. Ltd. is a bottling company that runs a filling process which should fill bottles with 12 plus or minus 0.04 ounces. A capability study has been initiated that reveals that the process mean is 12 ounces and the standard deviation is 0.01 ounces. Find the capability of the bottling process.

- a. 1.5
- b. 0.75
- c. 1.33**
- d. 0.67

23.) Which visual management tool reduces overproduction under lean manufacturing?

- a. Stand up meeting
- b. Visual display
- c. Kanban card**
- d. Color codes

Solution Explanation

Kanban card is the visual management tool reduces overproduction under lean manufacturing. Kanban is a Japanese term referring to sign board or visual signals that authorize the production or movement of items in manufacturing environment. A Kanban system is a self-regulating pull system that leads to shorter lead times and reduced inventory. Kanban systems are typically applied to items that have relatively constant demand and medium-to-high production volume.

24.) What does the CIM anticipates ?

- a. reduce cost of integration
- b. reintegration of material flow

*c. reintegration of special expertise organized in functional departments through integrated information process*

d. reintegration of physical labour

25.) What is the basis of the information age?

*a. Both information technology and knowledge workers*

b. Knowledge workers

c. None of these

d. Information technology

26.) What is the probability of getting ONE on both dices after rolling both and one dice shows ONE?

a. Sun Dec 31 09:36:00 UTC 1899

b. Sun Dec 31 01:03:00 UTC 1899

*c. Sun Dec 31 01:06:00 UTC 1899*

d. Sun Dec 31 01:36:00 UTC 1899

27.) What are the basis of competition for Indian manufacturing companies?

*a. All of these*

b. improved quality

c. high performance products

d. reduced cost

28.) Which stage in the production process does production leveling is applied?

a. Depends upon the flow

**b. Last**

c. First

d. Depends upon process

29.) How can an improvement in a system be defined, statistically? (1) An improvement in the mean outcome. (2) A decrease in the system variability. (3) A correction of an assignable cause.

a. Only (1) and (3)

b. Only (2) and (3)

**c. Only (1) and (2)**

d. All of these

30.) How many basic principles were given by Schonberger?

a. 5.0

**b. 7.0**

c. 8.0

d. 6.0

31.) Which principle of WCM focus on BPR?

**a. Process Orientation**

b. Cost reduction

c. Avoid False Tradeoffs

d. None of these

32.) What is the characteristic of stable change?

- a. generally unpredictable
- b. rapid
- c. evolutionary**
- d. revolutionary

33.) What will happen if a sample of parts is measured and also the mean of the sample measurements is outside the control limits?

- a. The process is in control, but not capable of producing within the established control limits.
- b. The process variance must also be in control.
- c. The process is within the established control limits with only natural causes of variation.
- d. The process is out of control and the cause can be established.**

34.) How was the success of a company was measured by, during the industrial age?

- a. Exploit intangible assets
- b. Economies of scale**
- c. Mobilize employee skills
- d. Customized high-quality products

35.) How many pillars are the basis on which World-Class manufacturing rests as per Gunn ?

- a. 4.0

- b. 5.0
- c. 6.0
- d. 3.0**

36.) What does KPIV relate to?

- a. Inputs**
- b. Incremental Variation
- c. Incrementing Variation
- d. Inherent Variation

37.) Which of the following focuses on proactive and progressive maintenance of equipments by utilizing the knowledge of operators?

- a. Six Sigma
- b. Total Productive Maintenance**
- c. SMED
- d. 5S

38.) Who gave the Integral Four Quadrant Approach?

- a. Peter Drucker
- b. None of these
- c. F. W. Taylor
- d. Ken Wilber**

39.) What is the result of summing all the deviations?

- a. 0.0
- b. 1.0
- c. -1.0
- d. Depends upon data

40.) How many parts does a work study consists of?

- a. 5.0
  - b. 2.0**
  - c. 4.0
  - d. 3.0
- 

41.) Which of the following statement holds true with reference to Process capability?

- a. It exists when the process is perfectly centered.
- b. It means that the natural variation of the process must be small enough to produce products that meet the standard.**
- c. It cannot be measured.
- d. It exists when CPK is less than 1.0.

42.) What level does the six sigma operates at?

- a. 99.9997% quality level**
- b. 99.977 % quality level
- c. 99.999998 % quality level
- d. 99.38% quality level

43.) The control requires \_\_\_\_\_, conceptually. (1) standards. (2) a stable system. (3) statistically established limits.

- a. Only (1) and (2)
- b. Only (2) and (3)
- c. All of these
- d. Only (1) and (3)**

44.) What does Jishu Hozen aims for under TPM implementation?

- a. Cleanliness
- b. Continuous improvement
- c. Less changeover time
- d. Autonomous maintenance**

Solution Explanation

Jishu Hozen, which means autonomous or self-maintenance, promotes development of production operators to be able to take care of small maintenance tasks, such as cleaning, inspecting, and lubricating their equipment, thus freeing the maintenance associates to spend time on more value-added activities and technical repairs. The operators are responsible for upkeep of their equipment to prevent it from deteriorating. Jishu Hozen (JH) has been shown to reduce oil consumption by 50% and process time by 50%.

45.) Given: Type I errors are where common cause variation is treated as assignable cause variation. Type II errors are where assignable cause variation is treated as common cause variation. Which of the following would minimize type II errors?

- a. Use SPC charts where the limits are based on 1 standard deviation.
- b. Use SPC charts where the limits are based on 3 standard deviations.

c. Use SPC charts where the limits are based on 2 standard deviations.

**d. Use budget comparisons against actual results without using the concept of SPC.**

46.) Who proposed concepts of a 'focused factory'

a. Hill

**b. Skinner**

c. Juran

d. Womack

47.) What percentage of the total population does a normal distribution, two standard deviations on each side of the mean would include ?

a. 0.68

b. 0.47

c. 0.34

**d. 0.95**

48.) How many goals were listed by Prabhala to achieve excellence in manufacturing?

a. 7.0

b. 6.0

c. 4.0

**d. 5.0**

49.) How many mudas are defined under Lean production?

**a. 7.0**

b. 8.0

c. 6.0

d. 5.0

50.) Which 5S phase results in usage of color codes?

**a. 2.0**

b. 3.0

c. 1.0

d. 4.0

Solution Explanation

Second phase in 5S, finds storage space for every needed tool or instrument and the spaces are properly marked. The organization of the storage space is in a way so that those can be found easily when needed. Setting in order also ensures finding the item by anyone else also easy and placing back at marked space. This marking remove useless searching, improves safety at work and make working environment better. Tools and wires are also marked or color coded for easy access and usage. Marking off the floor and dividing it into stations is also undertaken to make passages and simplify movements in the production areas. When pulling the lines, it is useful to mark places for pallets, pallet jacks and garbage cans at the same time. Color-codes and signs are used to prevent equipments getting mixed-up.

51.) Illustration: Let us take one type of error a manager can make is to blame a worker for an undesirable variation that is caused by the system. Refer to this as a type

I error. Another type of error a manager can make is to blame the system when a worker caused the undesirable variation. Refer to this as a type II error. If a company changed the basis for the upper and lower limits on a control chart from two standard deviations to three standard deviations. Which of the following statement holds true?

- a. The number of type I errors would increase.
- b. The number of both types of errors would increase.
- c. The number of type II errors would increase.**
- d. The number of both types of errors would decrease.

52.) How many assumptions does MANSI grid takes?

- a. 3.0
- b. 5.0
- c. 2.0**
- d. 4.0

53.) The control chart that should be used when it is possible to have more than one mistake per item is \_\_\_\_\_.

- a. R-chart
- b. X-bar chart
- c. P-chart
- d. C-chart**

54.) A variation that indicates that the system may be out of control is \_\_\_\_\_ . (1) common cause variation. (2) assignable cause variation. (3) special cause variation.

- a. Only (1) and (2)
- b. All of these
- c. Only (1) and (3)**
- d. Only (2) and (3)

55.) In terms of statistical process control (SPC), which of the following statement holds true with reference to the variation within a stable system?

- a. It is controllable.
- b. It is predictable within a range of values.
- c. It is in control.
- d. Both in control and is predictable within a range of values.**

56.) Which chart monitors the process variations due to the fluctuations of defects per item or group of items?

- a. c**
- b. np
- c. p
- d. u

57.) Which setup type need to be converted under SMED implementation, as per the eight techniques ?

- a. Internal**

- b. Functional clamps
- c. Intermediate jigs
- d. External

Solution Explanation

Internal setup type need to be converted under SMED implementation, as per the eight techniques. Machine must stop to perform the operation

58.) What unique challenges that businesses have to cope up during the information age?

- a. Managing Uncertainty
- b. Understanding Customers
- c. Understanding Globalization of Business
- d. All of these**

59.) Which of the following statement holds true with reference to a stable system?

(1) It is efficient. (2) It is predictable. (3) It is in control.

- a. All of these
- b. Only (2) and (3)
- c. Only (1) and (2)
- d. Only (1) and (3)**

60.) Which technique can effectively prevent the waste of excess motion?

a. 5S

b. Kaizen

c. None of these

d. SMED

Solution Explanation

5S are the principles of work environment improvement. Companies usually initiate with 5S, for their lean manufacturing program. Five S is a manageable process which people easily grasp and adapt to it. This technique focuses on standardized cleanup of the workplace but, involves much more than that. Five S is a method to organize and manage the workspace and work flow for improving efficiency by eliminating waste, improving work flow and reducing process inefficiencies. Five S is a reference to five Japanese words that have been translated into English. The 5S's are, Sort (Seiri), Straighten (Seiton), Sweep (Seiso), Standardize (Seiketsu) and Sustain (Shitsuke).

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