

PRACTICE EXAM 11: FE INDUSTRIAL AND SYSTEMS SIMULATION (110 QUESTIONS)

This practice exam contains 110 questions. For realistic pacing, allow 5 hours and 20 minutes of testing time within a 6-hour appointment. NCEES does not publish a fixed passing score; use this simulation diagnostically and review every explanation.

1. Practice Exam 11 scenario: Evaluate $3x + 2y$ when $x = 212$ and $y = 6$.

- A. 642
- B. 652
- C. 648
- D. 658

2. Practice Exam 11 scenario: A circular inspection zone has radius 204 m. What is its area?

- A. 1281.77 m²
- B. 640.88 m²
- C. 166464 m²
- D. 130740.52 m²

3. Practice Exam 11 scenario: What is the slope through (1, 204) and (5, 210)?

- A. 2
- B. 0.67
- C. 1
- D. 1.5

4. Practice Exam 11 scenario: Which matrix property is required for a unique solution of $Ax = b$ when A is square?

- A. Every entry of A is positive
- B. A contains only integer entries
- C. The determinant of A is nonzero
- D. The trace of A equals zero

5. Practice Exam 11 scenario: Evaluate $3x + 2y$ when $x = 216$ and $y = 4$.

- A. 650
- B. 656
- C. 660
- D. 666

6. Practice Exam 11 scenario: A circular inspection zone has radius 208 m. What is its area?

- A. 135917.86 m^2
- B. 1306.9 m^2
- C. 653.45 m^2
- D. 173056 m^2

7. Practice Exam 11 scenario: What is the slope through (1, 208) and (5, 214)?

- A. 2
- B. 0.67
- C. 1.5
- D. 1

8. Practice Exam 11 scenario: A cart of mass 218 kg accelerates at 2.5 m/s^2 . What net force acts on it?

- A. 535 N
- B. 545 N
- C. 550 N
- D. 87.2 N

9. Practice Exam 11 scenario: A process transfers 127800 J of energy uniformly in 1125 s. What is the average power?

- A. 90.88 W
- B. 136.32 W
- C. 143775000 W
- D. 113.6 W

10. Practice Exam 11 scenario: A cart of mass 220 kg accelerates at 2.5 m/s^2 . What net force acts on it?

- A. 550 N
- B. 540 N
- C. 555 N
- D. 88 N

11. Practice Exam 11 scenario: A process transfers 129000 J of energy uniformly in 1135 s. What is the average power?

- A. 90.93 W
- B. 113.66 W
- C. 136.39 W
- D. 146415000 W

12. Practice Exam 11 scenario: A supplier offers an undisclosed personal payment to influence an equipment recommendation. What should the engineer do?

- A. Refuse the payment and disclose the conflict through appropriate channels
- B. Accept it if the equipment is inexpensive
- C. Accept it after the purchase order
- D. Hide it in a consulting invoice

13. Practice Exam 11 scenario: An engineer discovers a design condition that creates an immediate public-safety risk. What should the engineer do first?

- A. Ignore it until a failure occurs
- B. Delete the supporting calculations
- C. Discuss it only after project closeout
- D. Notify the responsible parties promptly and recommend corrective action

14. Practice Exam 11 scenario: An engineer is asked to seal calculations outside the engineer's area of competence. What is the appropriate response?

- A. Seal them because the client requested it
- B. Copy a prior design without review
- C. Decline or obtain qualified competent assistance before accepting responsibility
- D. Delegate the seal to an unlicensed employee

15. During review cycle 2 at a medical-device assembly plant, practice Exam 11 scenario: A supplier offers an undisclosed personal payment to influence an equipment recommendation. What should the engineer do?

- A. Accept it if the equipment is inexpensive
- B. Refuse the payment and disclose the conflict through appropriate channels
- C. Accept it after the purchase order
- D. Hide it in a consulting invoice

16. During review cycle 2 at a hospital support operation, practice Exam 11 scenario: An engineer discovers a design condition that creates an immediate public-safety risk. What should the engineer do first?

- A. Ignore it until a failure occurs
- B. Delete the supporting calculations
- C. Notify the responsible parties promptly and recommend corrective action
- D. Discuss it only after project closeout

17. Practice Exam 11 scenario: An investment of \$110,000 earns 6% compounded annually for 4 years. What is its future worth?

- A. 138872.47 dollars
- B. 136400 dollars
- C. 87130.3 dollars
- D. 85882.39 dollars

18. Practice Exam 11 scenario: What present deposit is required to have \$216,000 in 5 years at 8% annual interest?

- A. 317374.86 dollars
- B. 154285.71 dollars
- C. 142361.61 dollars
- D. 147005.97 dollars

19. Practice Exam 11 scenario: A product has fixed cost \$226,000, selling price \$80, and variable cost \$50 per unit. What is break-even volume?

- A. 2825 units
- B. 7533 units
- C. 452 units
- D. 1738 units

20. Practice Exam 11 scenario: A uniform annual saving of \$46,600 occurs for 6 years. At 7%, what is its present worth?

- A. 222120.75 dollars
- B. 279600 dollars
- C. 333343.35 dollars
- D. 665714.29 dollars

21. Practice Exam 11 scenario: An investment of \$112,000 earns 6% compounded annually for 4 years. What is its future worth?

- A. 138880 dollars
- B. 88714.49 dollars
- C. 87443.88 dollars
- D. 141397.42 dollars

22. Practice Exam 11 scenario: What present deposit is required to have \$220,000 in 5 years at 8% annual interest?

- A. 323252.18 dollars
- B. 157142.86 dollars
- C. 149728.3 dollars
- D. 144997.94 dollars

23. Practice Exam 11 scenario: A product has fixed cost \$230,000, selling price \$80, and variable cost \$50 per unit. What is break-even volume?

- A. 2875 units
- B. 46 units
- C. 7667 units

D. 1769 units

24. Practice Exam 11 scenario: A uniform annual saving of \$47,400 occurs for 6 years. At 7%, what is its present worth?

A. 225933.98 dollars

B. 284400 dollars

C. 339065.98 dollars

D. 677142.86 dollars

25. Practice Exam 11 scenario: An investment of \$114,000 earns 6% compounded annually for 4 years. What is its future worth?

A. 141360 dollars

B. 143922.37 dollars

C. 90298.68 dollars

D. 89005.38 dollars

26. Practice Exam 11 scenario: What present deposit is required to have \$224,000 in 5 years at 8% annual interest?

A. 329129.49 dollars

B. 160000 dollars

C. 147634.26 dollars

D. 152450.64 dollars

27. Practice Exam 11 scenario: What is the sample mean of [208, 210, 212, 214]?

A. 210

B. 211

C. 212

D. 844

28. Practice Exam 11 scenario: Independent events A and B have probabilities 0.21 and 0.30. What is $P(A \text{ and } B)$?

A. 0.66

B. 2.51

C. 1.85

D. 7.37

29. Practice Exam 11 scenario: A normal measurement has mean 252 and standard deviation 5. What is the z-score for 262?

A. 1

B. 3

C. 2

D. 52.4

30. Practice Exam 11 scenario: Which chart is most appropriate for monitoring the fraction nonconforming when subgroup size varies?

A. An $\bar{X}$ -bar chart

B. An R chart

C. A c chart

D. A p chart

31. Practice Exam 11 scenario: What is the sample mean of [212, 214, 216, 218]?

A. 215

B. 214

C. 216

D. 860

32. Practice Exam 11 scenario: Independent events A and B have probabilities 0.25 and 0.30. What is $P(A \text{ and } B)$?

A. 2.55

B. 1.88

C. 0.67

D. 7.5

33. Practice Exam 11 scenario: A normal measurement has mean 256 and standard deviation 5. What is the z-score for 266?

A. 1

B. 3

C. 53.2

D. 2

34. During review cycle 2 at a public transit maintenance facility, practice Exam 11 scenario: Which chart is most appropriate for monitoring the fraction nonconforming when subgroup size varies?

A. An $\bar{X}$ -bar chart

B. A p chart

C. An R chart

D. A c chart

35. Practice Exam 11 scenario: What is the sample mean of [216, 218, 220, 222]?

A. 218

B. 220

C. 219

D. 876

36. Practice Exam 11 scenario: Independent events A and B have probabilities 2.29 and 0.30. What is $P(A \text{ and } B)$?

A. 2.59

B. 1.9

C. 7.63

D. 0.69

37. Practice Exam 11 scenario: A normal measurement has mean 260 and standard deviation 5. What is the z-score for 270?

A. 1

B. 2

C. 3

D. 54

38. Practice Exam 11 scenario: In a linear-programming model, what does a shadow price represent?

A. The marginal objective improvement from one additional unit of a binding resource

B. The market price of the final product

C. The fixed cost of adding any variable

D. The probability that a constraint is violated

39. Practice Exam 11 scenario: A linear program earns \$35 per unit of x and \$22 per unit of y. What objective value results at $x=205$, $y=3$?

A. 7241 dollars

B. 7206 dollars

C. 7263 dollars

D. 57 dollars

40. Practice Exam 11 scenario: For an M/M/1 queue with arrival rate 210/hour and service rate 214/hour, what is the expected number in the system?

A. 0.98 customers

B. 0.25 customers

C. 53.5 customers

D. 52.5 customers

41. During review cycle 2 at an automated distribution center, practice Exam 11 scenario: In a linear-programming model, what does a shadow price represent?

A. The market price of the final product

B. The fixed cost of adding any variable

C. The marginal objective improvement from one additional unit of a binding resource

D. The probability that a constraint is violated

42. Practice Exam 11 scenario: A linear program earns \$35 per unit of x and \$22 per unit of y. What objective value results at $x=208$, $y=3$?

A. 7311 dollars

B. 7346 dollars

C. 7368 dollars

D. 57 dollars

43. Practice Exam 11 scenario: For an M/M/1 queue with arrival rate 213/hour and service rate 217/hour, what is the expected number in the system?

A. 0.98 customers

B. 0.25 customers

- C. 53.25 customers
- D. 54.25 customers

44. During review cycle 3 at an automated distribution center, practice Exam 11 scenario: In a linear-programming model, what does a shadow price represent?

- A. The market price of the final product
- B. The marginal objective improvement from one additional unit of a binding resource
- C. The fixed cost of adding any variable
- D. The probability that a constraint is violated

45. Practice Exam 11 scenario: A linear program earns \$35 per unit of x and \$22 per unit of y . What objective value results at $x=211$, $y=3$?

- A. 7416 dollars
- B. 7473 dollars
- C. 57 dollars
- D. 7451 dollars

46. Practice Exam 11 scenario: For an M/M/1 queue with arrival rate 216/hour and service rate 220/hour, what is the expected number in the system?

- A. 54 customers
- B. 0.98 customers
- C. 0.25 customers
- D. 55 customers

47. During review cycle 4 at an automated distribution center, practice Exam 11 scenario: In a linear-programming model, what does a shadow price represent?

- A. The marginal objective improvement from one additional unit of a binding resource

- B. The market price of the final product
- C. The fixed cost of adding any variable
- D. The probability that a constraint is violated

48. Practice Exam 11 scenario: Which response transfers a financial risk to another party?

- A. Accepting the loss without action
- B. Eliminating the risky activity entirely
- C. Reducing occurrence through training
- D. Purchasing insurance for the identified exposure

49. Practice Exam 11 scenario: Which document formally authorizes a project and identifies its high-level objective and sponsor?

- A. The detailed time sheet
- B. The project charter
- C. The purchase receipt
- D. The control chart

50. Practice Exam 11 scenario: A project activity has earliest start 12, latest start 17, and duration 4 days. What is its total float?

- A. 9 days
- B. 17 days
- C. 5 days
- D. 21 days

51. During review cycle 2 at a medical-device assembly plant, practice Exam 11 scenario: Which response transfers a financial risk to another party?

- A. Accepting the loss without action

- B. Eliminating the risky activity entirely
- C. Reducing occurrence through training
- D. Purchasing insurance for the identified exposure

52. During review cycle 2 at a hospital support operation, practice Exam 11 scenario: Which document formally authorizes a project and identifies its high-level objective and sponsor?

- A. The project charter
- B. The detailed time sheet
- C. The purchase receipt
- D. The control chart

53. Scenario 2: Practice Exam 11 scenario: A project activity has earliest start 12, latest start 17, and duration 4 days. What is its total float?

- A. 9 days
- B. 17 days
- C. 5 days
- D. 21 days

54. During review cycle 3 at a medical-device assembly plant, practice Exam 11 scenario: Which response transfers a financial risk to another party?

- A. Accepting the loss without action
- B. Purchasing insurance for the identified exposure
- C. Eliminating the risky activity entirely
- D. Reducing occurrence through training

55. During review cycle 3 at a hospital support operation, practice Exam 11 scenario: Which document formally authorizes a project and identifies its high-level objective and sponsor?

- A. The detailed time sheet
- B. The purchase receipt
- C. The project charter
- D. The control chart

56. Scenario 3: Practice Exam 11 scenario: A project activity has earliest start 12, latest start 17, and duration 4 days. What is its total float?

- A. 9 days
- B. 17 days
- C. 21 days
- D. 5 days

57. Practice Exam 11 scenario: What is the primary purpose of a kanban signal in a pull system?

- A. Authorize replenishment based on downstream consumption
- B. Forecast annual financial statements
- C. Increase batch sizes without limit
- D. Eliminate all equipment maintenance

58. Practice Exam 11 scenario: Serial stations have capacities 221, 226, and 219 units/hour. What is line capacity?

- A. 226 units/hour
- B. 219 units/hour
- C. 666 units/hour
- D. 222 units/hour

59. Practice Exam 11 scenario: Monthly demand is 4840 units and production is 1000 units over 20 working days. How many production days meet demand?

- A. -76.8 days
- B. 96.8 days
- C. 4.84 days
- D. 96800 days

60. During review cycle 2 at a hospital support operation, practice Exam 11 scenario: What is the primary purpose of a kanban signal in a pull system?

- A. Forecast annual financial statements
- B. Increase batch sizes without limit
- C. Authorize replenishment based on downstream consumption
- D. Eliminate all equipment maintenance

61. Practice Exam 11 scenario: Serial stations have capacities 224, 229, and 222 units/hour. What is line capacity?

- A. 229 units/hour
- B. 675 units/hour
- C. 225 units/hour
- D. 222 units/hour

62. Practice Exam 11 scenario: Monthly demand is 4900 units and production is 1000 units over 20 working days. How many production days meet demand?

- A. 98 days
- B. -78 days
- C. 4.9 days
- D. 98000 days

63. During review cycle 3 at a hospital support operation, practice Exam 11 scenario: What is the primary purpose of a kanban signal in a pull system?

- A. Forecast annual financial statements
- B. Increase batch sizes without limit
- C. Authorize replenishment based on downstream consumption
- D. Eliminate all equipment maintenance

64. Practice Exam 11 scenario: Serial stations have capacities 227, 232, and 225 units/hour. What is line capacity?

- A. 232 units/hour
- B. 225 units/hour
- C. 684 units/hour
- D. 228 units/hour

65. Practice Exam 11 scenario: Monthly demand is 4960 units and production is 1000 units over 20 working days. How many production days meet demand?

- A. 99.2 days
- B. -79.2 days
- C. 4.96 days
- D. 99200 days

66. During review cycle 4 at a hospital support operation, practice Exam 11 scenario: What is the primary purpose of a kanban signal in a pull system?

- A. Forecast annual financial statements
- B. Increase batch sizes without limit
- C. Eliminate all equipment maintenance
- D. Authorize replenishment based on downstream consumption

67. Practice Exam 11 scenario: Which layout best supports a high-volume, low-variety assembly sequence?

- A. A fixed-position layout
- B. A product-oriented line layout
- C. A purely functional office layout
- D. A random storage layout

68. Practice Exam 11 scenario: Annual demand is 11250 units, order cost is \$241, and annual holding cost is \$3 per unit. What is EOQ?

- A. 672.22 units
- B. 2016.65 units
- C. 1344.43 units
- D. 1807500 units

69. Practice Exam 11 scenario: Demand averages 247 units/day, lead time is 6 days, and safety stock is 80. What is the reorder point?

- A. 1562 units
- B. 1482 units
- C. 327 units
- D. 21242 units

70. During review cycle 2 at a public transit maintenance facility, practice Exam 11 scenario: Which layout best supports a high-volume, low-variety assembly sequence?

- A. A fixed-position layout
- B. A purely functional office layout
- C. A random storage layout
- D. A product-oriented line layout

71. Practice Exam 11 scenario: Annual demand is 11400 units, order cost is \$244, and annual holding cost is \$3 per unit. What is EOQ?

- A. 680.88 units
- B. 1361.76 units
- C. 2042.65 units
- D. 1854400 units

72. Practice Exam 11 scenario: Demand averages 250 units/day, lead time is 6 days, and safety stock is 80. What is the reorder point?

- A. 1500 units
- B. 330 units
- C. 21500 units
- D. 1580 units

73. During review cycle 3 at a public transit maintenance facility, practice Exam 11 scenario: Which layout best supports a high-volume, low-variety assembly sequence?

- A. A product-oriented line layout
- B. A fixed-position layout
- C. A purely functional office layout
- D. A random storage layout

74. Practice Exam 11 scenario: Annual demand is 11550 units, order cost is \$247, and annual holding cost is \$3 per unit. What is EOQ?

- A. 689.55 units
- B. 2068.64 units
- C. 1379.09 units
- D. 1901900 units

75. Practice Exam 11 scenario: Demand averages 253 units/day, lead time is 6 days, and safety stock is 80. What is the reorder point?

- A. 1518 units
- B. 333 units
- C. 1598 units
- D. 21758 units

76. During review cycle 4 at a public transit maintenance facility, practice Exam 11 scenario: Which layout best supports a high-volume, low-variety assembly sequence?

- A. A product-oriented line layout
- B. A fixed-position layout
- C. A purely functional office layout
- D. A random storage layout

77. Practice Exam 11 scenario: What is the principal ergonomic benefit of keeping frequent reaches near the body?

- A. It increases required joint torque
- B. It reduces shoulder moment and muscular demand
- C. It eliminates the need for task lighting
- D. It guarantees zero fatigue for every worker

78. Practice Exam 11 scenario: Which control is preferred when a machine exposes an operator to a recurring pinch point?

- A. Rely only on a warning label
- B. Require workers to remember the hazard
- C. Accept the risk because exposure is brief
- D. Eliminate or physically guard the hazard

79. Practice Exam 11 scenario: For a display used to compare exact numerical values, which design is generally most appropriate?

- A. An unlabeled color patch
- B. A rapidly flashing indicator
- C. A decorative analog dial without scale
- D. A clearly labeled digital numeric display

80. During review cycle 2 at a hospital support operation, practice Exam 11 scenario: What is the principal ergonomic benefit of keeping frequent reaches near the body?

- A. It increases required joint torque
- B. It eliminates the need for task lighting
- C. It reduces shoulder moment and muscular demand
- D. It guarantees zero fatigue for every worker

81. During review cycle 2 at an automated distribution center, practice Exam 11 scenario: Which control is preferred when a machine exposes an operator to a recurring pinch point?

- A. Rely only on a warning label
- B. Eliminate or physically guard the hazard
- C. Require workers to remember the hazard
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- B. An unlabeled color patch
- C. A rapidly flashing indicator
- D. A decorative analog dial without scale

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- B. It eliminates the need for task lighting
- C. It guarantees zero fatigue for every worker
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- A. Eliminate or physically guard the hazard
- B. Rely only on a warning label
- C. Require workers to remember the hazard
- D. Accept the risk because exposure is brief

85. During review cycle 3 at a public transit maintenance facility, practice Exam 11 scenario: For a display used to compare exact numerical values, which design is generally most appropriate?

- A. An unlabeled color patch
- B. A clearly labeled digital numeric display
- C. A rapidly flashing indicator
- D. A decorative analog dial without scale

86. Practice Exam 11 scenario: What is the purpose of a predetermined motion-time system?

- A. Estimate annual depreciation from equipment purchase and salvage values
- B. Measure material composition using laboratory spectroscopy and chemical analysis
- C. Estimate task time from defined basic motions without stopwatch observation
- D. Set inventory reorder points from demand and replenishment data

87. Practice Exam 11 scenario: Observed cycle time is 24.6 minutes and performance rating is 110%. What is normal time?

- A. 22.36 minutes
- B. 27.06 minutes
- C. -2.46 minutes
- D. 25.7 minutes

88. Practice Exam 11 scenario: Normal time is 25.2 minutes and allowance is 15% of standard time. What is standard time?

- A. 28.98 minutes
- B. 3.78 minutes
- C. 21.91 minutes
- D. 29.65 minutes

89. During review cycle 2 at an automated distribution center, practice Exam 11 scenario: What is the purpose of a predetermined motion-time system?

- A. Estimate task time from defined basic motions without stopwatch observation
- B. Estimate annual depreciation from equipment purchase and salvage values
- C. Measure material composition using laboratory spectroscopy and chemical analysis
- D. Set inventory reorder points from demand and replenishment data

90. Practice Exam 11 scenario: Observed cycle time is 24.9 minutes and performance rating is 110%. What is normal time?

- A. 22.64 minutes
- B. -2.49 minutes
- C. 27.39 minutes
- D. 26 minutes

91. Practice Exam 11 scenario: Normal time is 25.5 minutes and allowance is 15% of standard time. What is standard time?

- A. 30 minutes
- B. 29.32 minutes
- C. 3.82 minutes
- D. 22.17 minutes

92. During review cycle 3 at an automated distribution center, practice Exam 11 scenario: What is the purpose of a predetermined motion-time system?

- A. Estimate annual depreciation from equipment purchase and salvage values
- B. Measure material composition using laboratory spectroscopy and chemical analysis
- C. Estimate task time from defined basic motions without stopwatch observation
- D. Set inventory reorder points from demand and replenishment data

93. Practice Exam 11 scenario: Observed cycle time is 25.2 minutes and performance rating is 110%. What is normal time?

- A. 22.91 minutes
- B. -2.52 minutes
- C. 26.3 minutes
- D. 27.72 minutes

94. Practice Exam 11 scenario: A point falls above the upper control limit on a stable-process chart. What is the proper interpretation?

- A. The process is automatically capable
- B. Investigate a likely special cause before routine adjustment
- C. Specifications must equal control limits
- D. No action or investigation is appropriate

95. Practice Exam 11 scenario: A stable process has $USL=110$, $LSL=90$, and standard deviation 23.1. What is C_p ?

- A. 0.29
- B. 0.14
- C. 1.44
- D. 6.93

96. Practice Exam 11 scenario: A sample of 500 units contains 214 nonconforming units. What fraction is nonconforming?

- A. 0.7483
- B. 2.3364
- C. 0.428
- D. 0.572

97. During review cycle 2 at an automated distribution center, practice Exam 11 scenario: A point falls above the upper control limit on a stable-process chart. What is the proper interpretation?

- A. Investigate a likely special cause before routine adjustment
- B. The process is automatically capable
- C. Specifications must equal control limits
- D. No action or investigation is appropriate

98. Practice Exam 11 scenario: A stable process has $USL=110$, $LSL=90$, and standard deviation 23.4. What is C_p ?

- A. 0.28
- B. 1.42
- C. 7.02
- D. 0.14

99. Practice Exam 11 scenario: A sample of 500 units contains 217 nonconforming units. What fraction is nonconforming?

- A. 0.7668
- B. 2.3041
- C. 0.566
- D. 0.434

100. During review cycle 3 at an automated distribution center, practice Exam 11 scenario: A point falls above the upper control limit on a stable-process chart. What is the proper interpretation?

- A. Investigate a likely special cause before routine adjustment
- B. The process is automatically capable
- C. Specifications must equal control limits
- D. No action or investigation is appropriate

101. Practice Exam 11 scenario: A stable process has $USL=110$, $LSL=90$, and standard deviation 23.7. What is C_p ?

- A. 0.28
- B. 0.14
- C. 1.41
- D. 7.11

102. Practice Exam 11 scenario: A sample of 500 units contains 220 nonconforming units. What fraction is nonconforming?

- A. 0.7857
- B. 2.2727
- C. 0.44
- D. 0.56

103. Practice Exam 11 scenario: In an FMEA, which combination generally deserves the greatest attention?

- A. High severity with meaningful occurrence or weak detection controls
- B. Low severity with excellent detection
- C. A cosmetic issue that never occurs
- D. An item with no system effect

104. Practice Exam 11 scenario: Which requirement is written in the most verifiable form?

- A. The system should be very fast
- B. The system shall process 95% of transactions within 2 seconds
- C. The interface shall feel modern
- D. Users should generally like the system

105. Practice Exam 11 scenario: What is the primary purpose of a requirements traceability matrix?

- A. Replace all configuration management
- B. Calculate employee payroll
- C. Link requirements to sources, design elements, and verification evidence
- D. Eliminate the need for stakeholder review

106. During review cycle 2 at a public transit maintenance facility, practice Exam 11 scenario: In an FMEA, which combination generally deserves the greatest attention?

- A. Low severity with excellent detection
- B. A cosmetic issue that never occurs
- C. An item with no system effect
- D. High severity with meaningful occurrence or weak detection controls

107. During review cycle 2 at a medical-device assembly plant, practice Exam 11 scenario: Which requirement is written in the most verifiable form?

- A. The system shall process 95% of transactions within 2 seconds

- B. The system should be very fast
- C. The interface shall feel modern
- D. Users should generally like the system

108. During review cycle 2 at a hospital support operation, practice Exam 11 scenario: What is the primary purpose of a requirements traceability matrix?

- A. Replace all configuration management
- B. Calculate employee payroll
- C. Eliminate the need for stakeholder review
- D. Link requirements to sources, design elements, and verification evidence

109. During review cycle 3 at a public transit maintenance facility, practice Exam 11 scenario: In an FMEA, which combination generally deserves the greatest attention?

- A. Low severity with excellent detection
- B. High severity with meaningful occurrence or weak detection controls
- C. A cosmetic issue that never occurs
- D. An item with no system effect

110. During review cycle 3 at a medical-device assembly plant, practice Exam 11 scenario: Which requirement is written in the most verifiable form?

- A. The system should be very fast
- B. The interface shall feel modern
- C. The system shall process 95% of transactions within 2 seconds
- D. Users should generally like the system

Practice Exam 11: Answer Key and Explanations

1. **C** — Substitution gives $3x$ plus $2y$. Multiplying each given value by its coefficient and then adding produces the keyed result. A disciplined solution checks algebra, units, and whether the result is reasonable before selecting an option. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.
2. **D** — Circle area equals π times the square of the radius, not circumference or a linear multiple of radius. A disciplined solution checks algebra, units, and whether the result is reasonable before selecting an option. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.
3. **D** — Slope is the change in the vertical coordinate divided by the change in the horizontal coordinate, using the same point order. A disciplined solution checks algebra, units, and whether the result is reasonable before selecting an option. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.
4. **C** — A square linear system has a unique solution precisely when its coefficient matrix is nonsingular, equivalently when its determinant is nonzero. A disciplined solution checks algebra, units, and whether the result is reasonable before selecting an option. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.
5. **B** — Substitution gives $3x$ plus $2y$. Multiplying each given value by its coefficient and then adding produces the keyed result. A disciplined solution checks algebra, units, and whether the result is reasonable before selecting an option. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.
6. **A** — Circle area equals π times the square of the radius, not circumference or a linear multiple of radius. A disciplined solution checks algebra, units, and whether the result is reasonable before selecting an option. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.
7. **C** — Slope is the change in the vertical coordinate divided by the change in the horizontal coordinate, using the same point order. A disciplined solution checks algebra, units, and whether the result is reasonable before selecting an option. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.
8. **B** — Newton's second law states that net force equals mass multiplied by acceleration for translational motion. The governing physical relationship and consistent units distinguish the correct result from common substitution errors. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.
9. **D** — Average power is energy transferred divided by elapsed time. Joules per second are watts, so division is required. The governing physical relationship and consistent units distinguish the correct result from common substitution errors. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

10. A — Newton's second law states that net force equals mass multiplied by acceleration for translational motion. The governing physical relationship and consistent units distinguish the correct result from common substitution errors. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

11. B — Average power is energy transferred divided by elapsed time. Joules per second are watts, so division is required. The governing physical relationship and consistent units distinguish the correct result from common substitution errors. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

12. A — An undisclosed payment compromises objective judgment and creates a conflict of interest. Refusal and disclosure protect the client, employer, procurement process, and public trust. Professional obligations prioritize public welfare, truthful communication, competence, and documented escalation through appropriate channels. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

13. D — Public safety is paramount. Promptly communicating the hazard to those able to act creates an opportunity to prevent harm and preserves an accurate professional record. Professional obligations prioritize public welfare, truthful communication, competence, and documented escalation through appropriate channels. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

14. C — Engineers should perform services only in areas of competence. Qualified assistance may expand the team, but responsibility cannot be accepted blindly or transferred improperly. Professional obligations prioritize public welfare, truthful communication, competence, and documented escalation through appropriate channels. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

15. B — An undisclosed payment compromises objective judgment and creates a conflict of interest. Refusal and disclosure protect the client, employer, procurement process, and public trust. Professional obligations prioritize public welfare, truthful communication, competence, and documented escalation through appropriate channels. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

16. C — Public safety is paramount. Promptly communicating the hazard to those able to act creates an opportunity to prevent harm and preserves an accurate professional record. Professional obligations prioritize public welfare, truthful communication, competence, and documented escalation through appropriate channels. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

17. A — Future worth under annual compounding is present worth multiplied by one plus the interest rate raised to the number of periods. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

18. D — Present worth discounts a future amount by the compound factor. Dividing by one plus the rate raised to the number of years moves cash backward in time. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly.

19. B — Break-even volume divides fixed cost by contribution margin per unit. Contribution margin is selling price minus variable cost, because each unit first recovers its variable cost. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly.

20. A — A uniform end-of-year series is converted to present worth using the P/A factor, which accounts for discounting each annual saving to time zero. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly.

21. D — Future worth under annual compounding is present worth multiplied by one plus the interest rate raised to the number of periods. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

22. C — Present worth discounts a future amount by the compound factor. Dividing by one plus the rate raised to the number of years moves cash backward in time. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly.

23. C — Break-even volume divides fixed cost by contribution margin per unit. Contribution margin is selling price minus variable cost, because each unit first recovers its variable cost. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly.

24. A — A uniform end-of-year series is converted to present worth using the P/A factor, which accounts for discounting each annual saving to time zero. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly.

25. B — Future worth under annual compounding is present worth multiplied by one plus the interest rate raised to the number of periods. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

26. D — Present worth discounts a future amount by the compound factor. Dividing by one plus the rate raised to the number of years moves cash backward in time. The correct comparison uses a consistent time basis, interest convention, and cash-flow sign convention for every alternative. The keyed choice follows directly. The keyed choice follows directly.

27. B — The arithmetic mean equals the sum of all observations divided by the number of observations. Every value receives equal weight. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly.

28. A — For independent events, the probability that both occur is the product of their individual probabilities, not their sum or conditional ratio. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

29. C — A z-score expresses distance from the mean in standard-deviation units. Subtract the mean from the observation and divide by the standard deviation. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

30. D — A p chart monitors a proportion nonconforming and adjusts its control limits when sample size changes. The other charts address variables or defect counts. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly.

31. A — The arithmetic mean equals the sum of all observations divided by the number of observations. Every value receives equal weight. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

32. C — For independent events, the probability that both occur is the product of their individual probabilities, not their sum or conditional ratio. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

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34. B — A p chart monitors a proportion nonconforming and adjusts its control limits when sample size changes. The other charts address variables or defect counts. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly.

35. C — The arithmetic mean equals the sum of all observations divided by the number of observations. Every value receives equal weight. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

36. D — For independent events, the probability that both occur is the product of their individual probabilities, not their sum or conditional ratio. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

37. B — A z-score expresses distance from the mean in standard-deviation units. Subtract the mean from the observation and divide by the standard deviation. The method follows from the data type, distributional assumptions, sampling plan, and statistic requested in the stem. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

38. A — A shadow price is the local change in the optimal objective value produced by relaxing a resource constraint by one unit within its allowable range. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly.

39. A — Evaluate a linear objective by multiplying each decision-variable level by its coefficient and adding the contributions. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

40. D — For a stable M/M/1 queue, expected number in the system is λ divided by $\mu - \lambda$. Stability requires service rate to exceed arrival rate. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly.

41. C — A shadow price is the local change in the optimal objective value produced by relaxing a resource constraint by one unit within its allowable range. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly.

42. B — Evaluate a linear objective by multiplying each decision-variable level by its coefficient and adding the contributions. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

43. C — For a stable M/M/1 queue, expected number in the system is λ divided by $\mu - \lambda$. Stability requires service rate to exceed arrival rate. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly.

44. B — A shadow price is the local change in the optimal objective value produced by relaxing a resource constraint by one unit within its allowable range. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly.

45. D — Evaluate a linear objective by multiplying each decision-variable level by its coefficient and adding the contributions. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

46. A — For a stable M/M/1 queue, expected number in the system is λ divided by $\mu - \lambda$. Stability requires service rate to exceed arrival rate. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly.

47. A — A shadow price is the local change in the optimal objective value produced by relaxing a resource constraint by one unit within its allowable range. Defining decision variables, constraints, units, and the objective precisely prevents an attractive but infeasible choice. The keyed choice follows directly. The keyed choice follows directly.

48. D — Risk transfer shifts specified financial consequences to another party, commonly through insurance or contract terms, while the underlying operational risk may remain. The decision should align scope, schedule, cost, risk, stakeholders, and measurable project objectives. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

49. B — A project charter formally initiates the project, identifies authority and sponsorship, and records high-level purpose, objectives, assumptions, constraints, and stakeholders. The decision should align scope, schedule, cost, risk, stakeholders, and measurable project objectives. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

50. C — Total float equals latest start minus earliest start. The activity may slip by that amount without delaying the calculated project completion date. The decision should align scope, schedule, cost, risk, stakeholders, and measurable project objectives. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

51. D — Risk transfer shifts specified financial consequences to another party, commonly through insurance or contract terms, while the underlying operational risk may remain. The decision should align scope, schedule, cost, risk, stakeholders, and measurable project objectives. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

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53. C — Total float equals latest start minus earliest start. The activity may slip by that amount without delaying the calculated project completion date. The decision should align scope, schedule, cost, risk,

stakeholders, and measurable project objectives. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

54. B — Risk transfer shifts specified financial consequences to another party, commonly through insurance or contract terms, while the underlying operational risk may remain. The decision should align scope, schedule, cost, risk, stakeholders, and measurable project objectives. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

55. C — A project charter formally initiates the project, identifies authority and sponsorship, and records high-level purpose, objectives, assumptions, constraints, and stakeholders. The decision should align scope, schedule, cost, risk, stakeholders, and measurable project objectives. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

56. D — Total float equals latest start minus earliest start. The activity may slip by that amount without delaying the calculated project completion date. The decision should align scope, schedule, cost, risk, stakeholders, and measurable project objectives. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

57. A — A kanban is a visual or electronic authorization triggered by consumption. It limits work in process and connects replenishment to actual downstream need. Capacity, flow, variability, setup, and bottleneck behavior must be evaluated together rather than in isolation. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

58. B — A serial line cannot sustain output above its lowest-capacity station. That bottleneck governs steady-state throughput unless capacity or buffering conditions change. Capacity, flow, variability, setup, and bottleneck behavior must be evaluated together rather than in isolation. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

59. B — Daily production rate equals monthly production divided by working days. Dividing required demand by that daily rate gives the production time needed. Capacity, flow, variability, setup, and bottleneck behavior must be evaluated together rather than in isolation. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

60. C — A kanban is a visual or electronic authorization triggered by consumption. It limits work in process and connects replenishment to actual downstream need. Capacity, flow, variability, setup, and bottleneck behavior must be evaluated together rather than in isolation. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

61. D — A serial line cannot sustain output above its lowest-capacity station. That bottleneck governs steady-state throughput unless capacity or buffering conditions change. Capacity, flow, variability, setup, and bottleneck behavior must be evaluated together rather than in isolation. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

62. A — Daily production rate equals monthly production divided by working days. Dividing required demand by that daily rate gives the production time needed. Capacity, flow, variability, setup, and

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64. B — A serial line cannot sustain output above its lowest-capacity station. That bottleneck governs steady-state throughput unless capacity or buffering conditions change. Capacity, flow, variability, setup, and bottleneck behavior must be evaluated together rather than in isolation. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

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66. D — A kanban is a visual or electronic authorization triggered by consumption. It limits work in process and connects replenishment to actual downstream need. Capacity, flow, variability, setup, and bottleneck behavior must be evaluated together rather than in isolation. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

67. B — A product layout arranges resources in processing sequence, minimizing travel and handling for standardized high-volume flow. Fixed-position and functional layouts serve different variety and movement needs. The analysis balances flow distance, service, inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly.

68. C — The basic EOQ balances annual ordering and holding costs. It is the square root of twice demand times order cost divided by unit holding cost. The analysis balances flow distance, service, inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

69. A — Reorder point covers expected demand during replenishment lead time plus safety stock. Multiplying daily demand by lead-time days gives expected lead-time demand. The analysis balances flow distance, service, inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

70. D — A product layout arranges resources in processing sequence, minimizing travel and handling for standardized high-volume flow. Fixed-position and functional layouts serve different variety and movement needs. The analysis balances flow distance, service, inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly.

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inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

72. D — Reorder point covers expected demand during replenishment lead time plus safety stock. Multiplying daily demand by lead-time days gives expected lead-time demand. The analysis balances flow distance, service, inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

73. A — A product layout arranges resources in processing sequence, minimizing travel and handling for standardized high-volume flow. Fixed-position and functional layouts serve different variety and movement needs. The analysis balances flow distance, service, inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly.

74. C — The basic EOQ balances annual ordering and holding costs. It is the square root of twice demand times order cost divided by unit holding cost. The analysis balances flow distance, service, inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

75. C — Reorder point covers expected demand during replenishment lead time plus safety stock. Multiplying daily demand by lead-time days gives expected lead-time demand. The analysis balances flow distance, service, inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

76. A — A product layout arranges resources in processing sequence, minimizing travel and handling for standardized high-volume flow. Fixed-position and functional layouts serve different variety and movement needs. The analysis balances flow distance, service, inventory, transportation, and resource constraints across the system. The keyed choice follows directly. The keyed choice follows directly.

77. B — Reducing reach distance lowers the moment arm of the handled load and therefore reduces shoulder torque and muscular effort during repeated work. Good design fits the task to human capabilities and controls hazards using reliable preventive measures. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

78. D — Hazard elimination and engineering controls act at the source and do not depend primarily on perfect human attention or behavior. Good design fits the task to human capabilities and controls hazards using reliable preventive measures. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

79. D — Digital displays support precise readings when exact values matter. Analog displays are often better for rate-of-change or position awareness, provided they have clear scales. Good design fits the task to human capabilities and controls hazards using reliable preventive measures. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

80. C — Reducing reach distance lowers the moment arm of the handled load and therefore reduces shoulder torque and muscular effort during repeated work. Good design fits the task to human

capabilities and controls hazards using reliable preventive measures. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

81. B — Hazard elimination and engineering controls act at the source and do not depend primarily on perfect human attention or behavior. Good design fits the task to human capabilities and controls hazards using reliable preventive measures. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

82. A — Digital displays support precise readings when exact values matter. Analog displays are often better for rate-of-change or position awareness, provided they have clear scales. Good design fits the task to human capabilities and controls hazards using reliable preventive measures. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

83. D — Reducing reach distance lowers the moment arm of the handled load and therefore reduces shoulder torque and muscular effort during repeated work. Good design fits the task to human capabilities and controls hazards using reliable preventive measures. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

84. A — Hazard elimination and engineering controls act at the source and do not depend primarily on perfect human attention or behavior. Good design fits the task to human capabilities and controls hazards using reliable preventive measures. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

85. B — Digital displays support precise readings when exact values matter. Analog displays are often better for rate-of-change or position awareness, provided they have clear scales. Good design fits the task to human capabilities and controls hazards using reliable preventive measures. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

86. C — Predetermined motion-time systems assign established times to basic human motions, enabling method comparison and time estimation before or without observing a complete production cycle. A valid work standard separates observed time, performance rating, normal time, and allowances without mixing their definitions. The keyed choice follows directly. The keyed choice follows directly.

87. B — Normal time adjusts observed time for the worker's performance rating. Multiply observed time by the rating expressed as a decimal. A valid work standard separates observed time, performance rating, normal time, and allowances without mixing their definitions. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

88. D — When allowance is defined as a fraction of standard time, divide normal time by one minus the allowance fraction. Multiplication uses a different allowance convention. A valid work standard separates observed time, performance rating, normal time, and allowances without mixing their definitions. The keyed choice follows directly. The keyed choice follows directly.

89. A — Predetermined motion-time systems assign established times to basic human motions, enabling method comparison and time estimation before or without observing a complete production cycle. A

valid work standard separates observed time, performance rating, normal time, and allowances without mixing their definitions. The keyed choice follows directly. The keyed choice follows directly.

90. C — Normal time adjusts observed time for the worker's performance rating. Multiply observed time by the rating expressed as a decimal. A valid work standard separates observed time, performance rating, normal time, and allowances without mixing their definitions. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

91. A — When allowance is defined as a fraction of standard time, divide normal time by one minus the allowance fraction. Multiplication uses a different allowance convention. A valid work standard separates observed time, performance rating, normal time, and allowances without mixing their definitions. The keyed choice follows directly. The keyed choice follows directly.

92. C — Predetermined motion-time systems assign established times to basic human motions, enabling method comparison and time estimation before or without observing a complete production cycle. A valid work standard separates observed time, performance rating, normal time, and allowances without mixing their definitions. The keyed choice follows directly. The keyed choice follows directly.

93. D — Normal time adjusts observed time for the worker's performance rating. Multiply observed time by the rating expressed as a decimal. A valid work standard separates observed time, performance rating, normal time, and allowances without mixing their definitions. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

94. B — A point beyond a control limit signals statistically unusual behavior consistent with a special cause. Investigation should precede adjustment because tampering can increase variation. The correct tool depends on whether the question concerns process stability, conformance, capability, sampling, or root cause. The keyed choice follows directly. The keyed choice follows directly.

95. B — C_p equals specification width divided by six standard deviations. It measures potential capability and does not account for process centering. The correct tool depends on whether the question concerns process stability, conformance, capability, sampling, or root cause. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

96. C — Fraction nonconforming is the count of nonconforming units divided by the total units inspected. It is a proportion between zero and one. The correct tool depends on whether the question concerns process stability, conformance, capability, sampling, or root cause. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

97. A — A point beyond a control limit signals statistically unusual behavior consistent with a special cause. Investigation should precede adjustment because tampering can increase variation. The correct tool depends on whether the question concerns process stability, conformance, capability, sampling, or root cause. The keyed choice follows directly. The keyed choice follows directly.

98. D — C_p equals specification width divided by six standard deviations. It measures potential capability and does not account for process centering. The correct tool depends on whether the question

concerns process stability, conformance, capability, sampling, or root cause. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

99. D — Fraction nonconforming is the count of nonconforming units divided by the total units inspected. It is a proportion between zero and one. The correct tool depends on whether the question concerns process stability, conformance, capability, sampling, or root cause. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

100. A — A point beyond a control limit signals statistically unusual behavior consistent with a special cause. Investigation should precede adjustment because tampering can increase variation. The correct tool depends on whether the question concerns process stability, conformance, capability, sampling, or root cause. The keyed choice follows directly. The keyed choice follows directly.

101. B — C_p equals specification width divided by six standard deviations. It measures potential capability and does not account for process centering. The correct tool depends on whether the question concerns process stability, conformance, capability, sampling, or root cause. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

102. C — Fraction nonconforming is the count of nonconforming units divided by the total units inspected. It is a proportion between zero and one. The correct tool depends on whether the question concerns process stability, conformance, capability, sampling, or root cause. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

103. A — FMEA prioritization considers severity, occurrence, and detection. A severe effect remains important, particularly when it may occur or current controls are unlikely to detect it. Requirements must be measurable and traceable, with interfaces, verification, risk, and lifecycle effects considered explicitly. The keyed choice follows directly. The keyed choice follows directly.

104. B — A verifiable requirement states a measurable threshold, population, and condition. Subjective words such as fast, modern, or like do not define an objective acceptance test. Requirements must be measurable and traceable, with interfaces, verification, risk, and lifecycle effects considered explicitly. The keyed choice follows directly. The keyed choice follows directly.

105. C — Traceability demonstrates that each requirement has an origin, implementation path, and verification method, while also helping identify the impact of proposed changes. Requirements must be measurable and traceable, with interfaces, verification, risk, and lifecycle effects considered explicitly. The keyed choice follows directly. The keyed choice follows directly. The keyed choice follows directly.

106. D — FMEA prioritization considers severity, occurrence, and detection. A severe effect remains important, particularly when it may occur or current controls are unlikely to detect it. Requirements must be measurable and traceable, with interfaces, verification, risk, and lifecycle effects considered explicitly. The keyed choice follows directly. The keyed choice follows directly.

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110. C — A verifiable requirement states a measurable threshold, population, and condition. Subjective words such as fast, modern, or like do not define an objective acceptance test. Requirements must be measurable and traceable, with interfaces, verification, risk, and lifecycle effects considered explicitly. The keyed choice follows directly. The keyed choice follows directly.