

21 — PRODUCTION AND INDUSTRIAL ENGINEERING

(Answer ALL questions)

56. For a circular column having its ends hinged, the slenderness ratio is 160. The L/d ratio of the column is
1. 80
 2. 57
 3. 40
 4. 20
57. A Hartnell governor has its controlling force F given by $F = p + qr$ where r is the radius of the balls and p and q are constants. The governor becomes isochronous when
1. $p = 0$ and q is positive
 2. p is positive and $q = 0$
 3. p is negative and q is positive
 4. p is positive and q is also positive
58. In a plate cam mechanism with reciprocating roller follower, the follower has a constant acceleration in the case of
1. Cycloidal motion
 2. Simple harmonic motion
 3. Parabolic motion
 4. 3-4-5 polynomial motion
59. Lewis equation in gears is used to find the
1. tensile stress
 2. compressive stress in bending
 3. contact stress
 4. fatigue stress
60. In the assembly of pulley, key and shaft
1. pulley is made the weakest
 2. key is made the weakest
 3. key is made the strongest
 4. all the three are designed for equal strength
61. Semi-centrifugal casting is used to
1. ensure purity and density at extremities of a casting
 2. cast symmetrical objects
 3. obtain high density and pure castings
 4. use heavy cast iron mould to act as chill
62. Machine used to draw the pattern from the mould is known as
1. Sand slinger
 2. Jolt machine
 3. Stripper-plate machine
 4. Squeezing machine
63. Fluidity is greatly influenced by
1. melting temperature
 2. tapping temperature
 3. pouring temperature
 4. solidification temperature
64. Freezing ratio or relative freezing time according to Caine's equation is
1. $\frac{A_C/V_C}{A_R/V_R}$
 2. $\frac{A_R/V_R}{A_C/V_C}$
 3. $\frac{V_C/A_C}{V_R/A_R}$
 4. $\frac{V_R/A_R}{V_C/A_C}$
65. Producing contours in flat blanks is called
1. piercing
 2. contouring
 3. blanking
 4. perforating
66. The velocity of operation in power drop hammer is of the order of
1. 0.1 to 0.8 m/sec
 2. 0.8 to 0.15 m/sec
 3. 1.5 to 3.0 m/sec
 4. 3.0 to 9.0 m/sec
67. Mechanical properties of the metal improve in hot working due to
1. recovery of grains
 2. recrystallization
 3. grain growth
 4. refinement of grain size

68. For drawing operation, the best suited press is
1. knuckle joint press
 2. crank shaft and connecting rod press
 3. toggle press
 4. rack and pinion press
69. For constructing a tank or bucket, welding used is
1. Seam welding
 2. Forge welding
 3. Cold welding
 4. Pressure gas welding
70. Which one of the following metals has the least weld ability?
1. Carbon steel
 2. Iron
 3. Stainless Steel
 4. Cast iron
71. For welding stainless steel by MIG process, the gas used is
1. Acetylene
 2. CO₂
 3. Pure argon gas
 4. Nitrogen
72. In arc welding, the open circuit voltage is in the range of
1. 20-40 volts
 2. 125-220 volts
 3. 220-440 volts
 4. 40-95 volt
73. Dye penetrant test is suitable for testing weld defects such as
1. over lap
 2. slag inclusion
 3. incomplete penetration
 4. surface cracks
74. In the Taylor's equation $VT^n = C$, the value of n for ceramic tools is
1. 0.4 to 0.55
 2. 0.2 to 0.55
 3. 0.6 to 0.7
 4. 0.1 to 0.15
75. For grinding high tensile strength materials, which of the following abrasive is recommended?
1. Al₂O₃
 2. SiC
 3. Diamond
 4. Corundum
76. Drilling of hole (0.025) in fuel injection nozzle can be done by
1. ECF
 2. ECG
 3. ECM
 4. EDM
77. In ultrasonic drilling process, the tool is usually given
1. rotary motion
 2. reciprocating motion
 3. linear motion
 4. both rotary and reciprocating motion
78. In a turning operation the tool life of the carbide tool was found to be 20 min at 100 m/min at cutting speeds of 120 m/min and 80 m/min respectively. What will be the tool life of that tool under the same condition at a cutting speed of 100 m/min?
1. 31 mins
 2. 36 mins
 3. 41 mins
 4. 46 mins
79. For harder metals, the amount of plastic deformation is
1. less
 2. more
 3. moderate
 4. uncertain

80. Distance of ram movement from its up position to its down position is called
1. shut height
 2. stroke
 3. adjustment
 4. die space
81. Two cutters are mounted on the arbor so that two faces are machined simultaneously in
1. Gang milling
 2. Straddle milling
 3. Pendulum milling
 4. Profile milling
82. The compressive stress is high for punch tool materials and hence the value of punch dia/thickness of stock ratio should not fall below
1. 1.00
 2. 1.5
 3. 0.5
 4. 0.25
83. Generally clamps are used to control
1. 3 freedoms
 2. 6 freedoms
 3. 9 freedoms
 4. 12 freedoms
84. Which one of the following is the least accurate measuring device?
1. Air gauge
 2. Micrometer screw gauge
 3. Steel scale
 4. Vernier micrometer
85. In case of high precision surface plates of diameter upto 200 mm, the working surface should lie between two parallel planes, whose maximum distance apart is
1. 0.005 mm
 2. 0.0005 mm
 3. 0.05 mm
 4. 0.5 mm
86. The graphical solution is possible, only for LP with
1. two constraints
 2. two variables
 3. maximisation objective
 4. minimisation objective
87. A degenerate simplex iteration is a one in which
1. solution is optimal
 2. solution is unbounded
 3. there is no improvement in solution
 4. solution is infeasible
88. An Assignment problem can be solved using Hungarian method, only if
1. number of rows = number of columns
 2. total demand = total supply
 3. all the cell elements are zero
 4. row sum > column sum
89. In PERT/CPM dummy activities are required to
1. satisfy the precedence requirements
 2. balance the resources
 3. minimise the duration of activities
 4. reduce the slack
90. In a housing colony, the technique employed to determine the minimum length of pipe required to connect a water tank and all the houses is
1. Shortest path
 2. Maximal flow
 3. CPM
 4. Minimal spanning tree
91. The 'P' system of inventory control refers to
1. Fixed period of review
 2. Fixed order quantity
 3. EOQ based order
 4. ABC analysis

92. In game theory rule of dominance is used to
1. solve the game
 2. find the value of the game
 3. find the saddle point
 4. reduce the pay off matrix size
93. In queuing terminology 'balking' refers to
1. a customer already in the queue leaving the queue
 2. a customer already in the queue jumping to another queue
 3. an arriving customer not joining the queue
 4. number of customers in the queue
94. A forecasting technique consistently produces a negative tracking signal. This means that
1. the MAPE will also consistently be negative
 2. the MSE will also consistently be negative
 3. the forecasting technique consistently under predicts
 4. the forecast technique consistently over predicts
95. Which of the following is a mixed strategy for absorbing demand fluctuations in Aggregate Production Planning?
1. Altering the production rate by changing the size of the labor force
 2. Using subcontracting to meet peak fluctuations in demand
 3. Using overtime, inventory, and subcontracting
 4. Keeping the work force and production rate constant, and allowing fluctuations in the inventory level
96. Efficiency is given by
1. Actual output divided by design capacity
 2. Capacity divided by utilization
 3. Effective capacity divided by actual output
 4. Actual output divided by effective capacity
97. In MRP, _____ is the amount of materials necessary to support production of the required output in the next higher level in the bill of materials.
1. Planning horizon
 2. Available to promise
 3. Net requirements
 4. Gross requirements
98. Dispatching
1. is concerned with the starting of processes
 2. prescribes the sequence of operations to be followed
 3. determines the programme for the operations
 4. regulates the progress of job through various processes
99. Which of the following is NOT associated with Just-in-Time production?
1. Building daily to meet daily demand
 2. Large, economical lot sizes
 3. Group technology
 4. Reductions in set-up times
100. The production cost per unit can be reduced by
1. Producing more with increased inputs
 2. Producing more with the same inputs
 3. Eliminating idle time
 4. Minimizing resource waste
101. The basic break-even model
1. Demonstrates that the break-even point increases as output volume increases
 2. Demonstrates that fixed costs remain constant as output volume increases
 3. Demonstrates that total revenue is fixed as output volume increases
 4. Demonstrates that per unit variable costs vary as output volume increases
102. LOC-based software cost estimation techniques require problem decomposition based on
1. information domain values
 2. project schedule
 3. software functions
 4. process activities

103. When using Activity Based Costing; a cost centre would be normally be known as a
1. profit centre
 2. cost driver
 3. cost pool
 4. cost unit
104. The advantage of Highly Accelerated Life Testing (HALT) is
1. Minimizes destructive stress levels
 2. Maximizes life cycle costs
 3. Minimizes costly warranty claims
 4. Maximizes maintenance benefits
105. Events with no common elements are known as
1. Mutually exclusive elements
 2. Independent events
 3. Dependent events
 4. Bayesian events
106. Total Productive Maintenance is related to
1. System Readiness
 2. Autonomous Maintenance
 3. Toyota Production System
 4. Zero Defects
107. Reliability improvement is not possible through
1. System Simplification
 2. Redundancy
 3. Maintenance
 4. Accelerated Testing
108. Process capability index can be determined with the help of
1. Control charts
 2. Stress-Strength Analysis
 3. Multi variate analysis
 4. Flow diagram
109. While testing the goodness of fit of the failure times into a theoretical distribution, the level of significance α for a stricter test is usually
1. 5%
 2. 10%
 3. 1%
 4. 3%
110. If the repair times follow Lognormal distribution, then Mean Time To Repair MTTR can be calculated if we know
1. Standard normal variate and Maintainability
 2. Shape parameter of the distribution and Median Time To Failure
 3. Maintainability and Shape parameter of the distribution
 4. Standard normal variate and Shape parameter of the distribution
111. Following is one of the reliability evaluation tools for complex configuration
1. Decomposition method
 2. Constant failure rate model
 3. Bartlett's Test
 4. AMSAA model
112. The one which is not related to Statistical Process Control is
1. Matrix diagram
 2. Rational Subgrouping
 3. Machine capability study
 4. Tolerance design
113. Warning control limits in control charts would give quality control manager the advice,
1. Look for trouble to take action
 2. Start being suspicious that trouble is brewing
 3. Leave the process alone
 4. Use control charts for individual measurements
114. Duane Model is a methodology useful in
1. Reliability prediction
 2. Reliability testing
 3. Reliability Growth Monitoring
 4. Reliability Management
115. ASN stands for
1. Average Satisfied Number
 2. Acceptable Sample Number
 3. Average Sample Number
 4. Acceptable Strategy Number