

Operation Management

Objective Type Question's and Answer's

1. Fill up the blanks:

1. Intension of modern industries is to create appropriate number of useful_____ at reasonable price.
 2. ----- is a device for transforming or transferring energy.
 3. The parts in contact with the job for doing different operations or generation of surfaces of products are known as_____.
 4. _____ used for removing metal to attend desired shape and size and operated by machine power.
 5. In _____ operations, a metal is given a desired shape and size by removing excess material in the form of chips.
 6. In _____ operation, a metal is given desired shape and size by deformation without removing any chips.
 7. Rolling, Forging, etc., are the examples of metal _____ operation.
 8. Turning, Drilling, Milling, Grinding, etc., are the examples of metal _____ operations.
 9. Machine Tools are to perform a great variety of machining operation with variety of jobs by using number of attachment.
 10. -----drive possesses low initial cost, economical in fixed charges, having overloading and variable loading facilities and one motor can run different Machine Tools at a time.
 11. ----- tool is required in Machine Tools for giving desired shape and sizes of a product.
 12. In ----- cutting, the cutting edge of the tool is 90 degree to the directions of relative motion between the tool and job.
 13. In ----- cutting, feed force and cutting forces are considered.
 14. Effective time elapsed between two successive grinding of a tool is called_____.
 15. ----- tool life equation is the relationship between the cutting speed and tool life.
 16. ----- is defined as the property of the material by virtue of which it may be machined easily with a cutting tool under a given set conditions.
 17. _____ is supplied at the job-tool interface to improve the cutting condition and also tool life.
 18. Synthetic coolants is mostly used in _____ operations.
 19. Sodium nitrate is used with cutting fluid as _____ inhabiter.
 20. _____ is added in compound oil cutting fluid for antiweld characteristics.
 21. _____ oil is used as cutting fluid for machining soft steel.
 22. Systematic naming of different single-point cutting tool angles are known _____ for machining M.S., M.C.S., etc. by H.S.S. cutting tool.
 23. Ideal condition of setting of tool should be on _____ line during operation, which will maintain both front clearance and back rake angles.
 24. ----- is a floor of assembly of several Machine Tools like, Lathe, Power-Saw, Drilling machines, etc.
 25. In metal cutting, the cutting tool removes a layer from the workpiece to obtain a desired shape and dimensions of the workpiece. The layer separated near the cutting edge of the tool is known as _____.
 26. _____ chips are produced when the material ahead of the cutting edge continuously deform with fracture or rupture and flows off the tool face by plastic deformation in the form of a ribbon.
 27. _____ chips are produced while machining typical material in which the yield strength decrease with rise in temperature like steel titanium alloys, etc., at medium cutting speed.
 28. While turning ductile material producing long unbroken chips, the device used to break into comparatively small pieces for easy handling of chips is known as chip _____.
 29. Wear or worn on the top flank of the tool at chip-tool interface during machining is known as _____ wear, and wear or worn on side flank of the tool at job-tool interface is known as _____ wear.
 30. Cast-iron during machining produces _____ chips.
 31. Mild steel during machining with appropriate cutting condition produces _____ chips.
 32. Negative rake angle is usually provided on _____ tool.
 33. Binding material used in Cemented Carbide tools is _____.
 34. Tool signature consists of _____ elements.
- State whether the following statements are True or False:
35. Tools which are operated or controlled by a motor or any prime-mover in performing different operations known as Hand Tools.
 36. There must be two relative motions in any metal cutting.
 37. Single purpose machine tools are designed to perform a certain specified operations in machining a large quantities.
 38. In a self-drive system, each machine tool is driven by its own motor.
 39. In self-drive, layout is easy and less chance of accident.
 40. Overhead crane facility is difficult in self-drive system.
 41. Overloading is possible in individual drive.
 42. Right-hand tool moves from right to the left-hand end of the Lathe bed.
 43. High speed steel tool having 18% Tungsten, 4% Chromium, 1% Vanadium and rest Iron.
 44. Cemented carbide tool having 150 m/min. cutting speed and 1500°C hot hardness.

45. In oblique cutting, the cutting edge of the tool is inclined (obtuse angle) at an angle greater than 90 degree to the direction of relative motion between the tool and the job.
46. The equation $V T_L^n = C$ is true in case of Taylor's tool life.
47. Machinability increases with the increase of cutting forces.
48. Choice of cutting fluid mainly depends on friction at job-tool interface, job material, type of operations, cutting conditions, etc.
49. Water is used as dry coolant.
50. Use of Sulphur in mixed oil is essential for tough and stringy material machining.
51. Mineral lard oil as cutting fluid is used to machine Hard Steel and Bronze.
52. Positive rake angle in single point turning tool is essential in shaping and planing machines.
53. Nose radius in cutting tool reduces tool life and surface finish.
54. Continuous chips with built-up edge are formed during machining of mild steel with low cutting speed, high feed, without using cutting fluid, etc.
55. Shank is that portion of the tool which does not ground to form cutting edges.
56. Positive back rake angle of a single point tool is the slope downward towards the shank.
57. Cutting fluid has no effect on the tool life.
58. Higher depth of cut increases rate of metal removal.
59. Cutting fluid is used to reduce friction and improve tool life.
60. In machining cast-iron, dry air is used.
61. Modern Machine Tools are not using self-drive.
62. Tool life is inversely proportional to speed.
63. Sodium Nitrate is not used as rust preventer with cutting fluid.
64. In metal cutting, chips are removed due to plastic deformation of metals.
65. In oblique cutting, the maximum chip thickness occurs at the middle of the generating surface.
66. Rate of metal removal is decreased by increasing the depth of cut in any metal cutting.
67. Back rake angle of a single point tool is the angle by which the face of the tool is inclined towards the shank.
68. In order to prevent tool against rubbing with the work, front clearance angles on tools are provided.
69. Positive back rake angle on tools are provided for easy flow of chips.
70. Crater wear is usually occurred while machining brittle materials.
71. Coolant or lubricant has no effect on tool life.
72. Tungsten increases the hot hardness of tool material.
73. Tool signature consists of six elements.
74. In machining cast-iron, cutting fluid as blow of air is required.
- Choose the correct one from the alternatives given below against each question:**
75. In machining mild steel work piece by H.S.S. tool, the average cutting speed for general work is:
(i) 20 m/min. (ii) 30 m/min. (iii) 40 m/min. (iv) 50 m/min.
76. In machining cast-iron work piece by H.S.S. tool, the average cutting speed for general work is:
(i) 25 m/min. (ii) 35 m/min. (iii) 45 m/min. (iv) 55 m/min.
77. In machining mild steel workpiece by Cemented Carbide tool, the average cutting speed is:
(i) 30 m/min. (ii) 60 m/min. (iii) 150 m/min. (iv) 600 m/min.
78. In machining M.S. workpiece by H.S. .S. tool, the hot hardness of the tool is:
(i) 350°C (ii) 900°C (iii) 1000°C (iv) 1200°C
79. In machining M.S. workpiece by Cemented Carbide tool, the hot hardness of the tool is:
(i) 900°C (ii) 1200°C (iii) 1500°C (iv) 1650°C
80. Choose the machine tool designed to perform a great variety of machining operations with a variety of work pieces by using number of attachment:
(i) Single-purpose M/c Tool (ii) Product-oriented M/c Tool (iii) Universal M/c Tool (iv) None of the above.
81. Choose the cutting tool material mostly used for general purpose:
(i) Medium alloy steel (ii) High speed steel (iii) Cemented carbide (iv) Ceramic.
82. Choose the cutting tool material mostly used in production work:
(i) H.S.S. (ii) Cast non-ferrous stellite cobalt (iii) Cemented carbide (iv) Ceramic.
83. The relation between the tool life (T) and cutting speed (V) according to the Taylor's tool life equation is:
(i) $T_L V^n = C$ (ii) $V T_L^n = C$ (iii) $V^n / T_L = C$ (iv) $T_L^n / V = C$
84. In any metal cutting, cutting forces at job-tool contact point is measured by:
(i) Wattmeter (ii) Dynamometer (iii) Pyrometer (iv) Hydrometer
85. Cemented carbide tool tips are fixed on tool holder by:
(i) Welding (ii) Soldering (iii) Brazing (iv) Clamping
86. Cemented Carbide tools retain hot hardness due to use of:
(i) Chromium (ii) Tungsten (iii) Nickel (iv) Vanadium
87. Main characteristics of cutting tool materials are:
(i) High toughness and low co-efficient of friction (ii) To retain strength and hardness at elevated temperature
(iii) To withstand shock and vibration and to prevent breakage (iv) All of the above.
88. The main function of chip breaker is:
(i) Break chips into segments (ii) Flashing chips from bed (iii) To increase tool life
(iv) To minimize cutting forces.
89. The cutting fluid mostly used for machining mild steel is:
(i) Mineral lard oil (ii) Soluble oil (iii) Sulphur base mixed oil (iv) Chlorine base mixed oil.
90. Cutting fluid used for machining cast-iron is:

- (i) Blow of air (ii) Water (iii) Soluble oil (iv) Compound oil
91. Cutting fluid used for machining mild steel and bronze is:
(i) Soluble oil (ii) Synthetic coolant (iii) Mineral lard oil (iv) Turpentine
92. In oblique cutting of metals, the cutting edge of the tool is:
(i) 90 degree to the direction of relative motion between the tool and the job (ii) Inclined to less than 90 degree to the direction of the tool travel (iii) Perpendicular to the workpiece (iv) Parallel to the direction of the tool travel
93. Which statement is true in case of a Diamond?
(i) Hardest material (ii) Used as a tool material (iii) Expensive (iv) Used in jewellery
94. The cutting edge of the right-hand tool in turning machined most efficiently when tool travels:
(i) Across bed (ii) From right to the left (iii) From left to the right (iv) None of the above
95. Tool moves from Headstock end to the Tailstock end known as:
(i) Turning tool (ii) Thread cutting tool (iii) Right-hand tool (iv) Left-hand tool
96. In order to decrease the cutting forces, improve strength of steel and wear resistance, alloying element generally added to steel is:
(i) Tungsten (ii) Nickel (iii) Manganese (iv) Molybdenum
97. Which force is the main force in orthogonal cutting during turning operation?
(i) Feed force (ii) Cutting force (iii) Thrust force (iv) None of the above
98. What are the forces considered in orthogonal cutting?
(i) Cutting and feed forces (ii) Cutting and thrust forces
(iii) Feed and thrust force (iv) Cutting feed and thrust forces
99. Tool life is over due to:
(i) Excessive heat generated due to friction at job-tool interface (ii) Very poor surface finish (iii) Sudden increase of cutting forces and hence more power consumption (iv) All of the above
100. Tool life of a cutting tool can measure by:
(i) Effective operational time (ii) Number of workpiece machined between resharpenings (iii) Volume of material removed between resharpenings (iv) All of the above .
101. Factors for evaluation of machinability is:
(i) Tool life (ii) Power consumption and cutting forces
(iii) Shear angle and type of chips (iv) Surface finish (v) All of the above
102. Functions of cutting fluid in a metal cutting operation are: (i) To cool chip, tool and workpieces (ii) To lubricate and reduce friction (iii) To improve surface finish and decrease wear (iv) All of the above
103. Most ideal property of an ideal cutting fluid is:
(i) Low viscosity (ii) Non-contaminate (iii) High heat absorbent (iv) Low evaporation rate
104. Which of the following statements is wrong?
(i) Positive rake angle, increase tool life and decreases power consumptions
(ii) Negative rake angle, strengthen the tool (iii) Zero rake angle, improves surface finish (iv) Higher clearance angle, reduce friction and wear
105. The surface finish is improved by.
(i) Optimum cutting speed (ii) Greater rake angle (iii) Moderate nose angle (iv) All of the above
106. Choose, which of the items will be increased for bulk of metal removal:
(i) Machine speed (ii) Feed (iii) Tool geometry (iv) Depth of cut
107. Which statement favours the advantages of group drive?
(i) Group of machine tools run by a single motor (ii) Available of variable power consumptions (iii) Overloading is possible (iv) All of the above.
108. Tool life is very much effected by:
(i) Depth of cut (ii) Tool geometry (iii) Cutting speed (iv) Feed
109. Nature of curve against relationship between the cutting speed (V) and the tool life (T_L) is:
(i) Parabola (ii) Hyperbola (iii) Straight Line (iv) None of the above
110. In Taylor's equation $V T_L^n = C$, value of index is closely depending on:
(i) Set conditions (ii) Work material (iii) Tool material (iv) None of the above
111. Main function of an ideal cutting fluid is:
(i) As coolant (ii) As lubricant and coolant both (iii) As lubricant (iv) As flashing action
112. Last element of tool geometry is:
(i) Side cutting edge angle (ii) End cutting edge angle (iii) Trial angle (iv) Nose radius.
113. With same tool life, the production capacity can be increased by increasing:
(i) Feed (ii) Cutting speed (iii) Depth of cut (iv) None of the above.
114. During machining cast-iron produces_____
(i) Continuous chip (ii) Discontinuous chip (iii) Continuous with built-up-edge chip (iv) Ground chip.
115. During machining mild steel produces_____
(i) Continuous chip (ii) Discontinuous chip (iii) Continuous with built-up-edge chip (iv) Either (i) or (iii)
(v) Either (ii) or (iii).
116. The factors on which tool life depends:
(i) Hardness of job material (ii) Quality of tool material (iii) Tool geometry (iv) Cutting speed
(v) Cross-section of the chip (vi) All of the above (vii) None of the above.
117. Better machinable material is one which gives:
(i) Larger shear angle (ii) Smaller shear angle (iii) Low chip-tool contact area (iv) High chip-tool contact area
(v) Both (i) and (iii) (vi) Both (ii) and (iv).
118. With same tool life, the productivity can be increased by increasing:
(i) Cutting speed (ii) Feed (iii) Depth of cut (iv) None of the above.

119. Machinability of the workpiece material can be predicted by the following factor:

(i) Tensile strength (ii) Brinell hardness (iii) Shear angle (iv) All of the above.

Match the correct answer from group 'B' against statement given in group 'A':

120. Match the standard machine tool with respect to the tool movement

Group-A	Group-B
(a) Forward translation	(i) Drilling
(b) Reciprocating	(ii) Lathe
(c) Rotary	(iii) Milling
(d) Rotary as well as translation	(iv) Shaping
	(v) Planing.

121. Match the standard machine tool with respect to the job movement

Group-A	Group-B
(a) Forward translation	(i) Lathe
(b) Reciprocating	(ii) Milling
(c) Rotary	(iii) Planing
(d) Intermittent translatory motion	(iv) Drilling
(e) Stationary	(v) Shaping.

122. Match the properties of cutting tool material

Group-A	Group-B
(a) Nickel	(i) Increases keenness of cutting-edges
(b) Tungsten	(ii) Increases strength and toughness
(c) Chromium	(iii) High elastic limit and corrosion resistance
(d) Cobalt	(iv) Fine grain structure and also increases keenness of cutting edges
(e) Molybdenum	(v) Increases hardness and strength also hot hardness and wear resistance
(f) Vanadium	(vi) Excellent hot hardness and forms stability.

123. Match the tool material with respect their composition

Group-A	Group-B
(a) Cast-non-ferrous-stellite cobalt	(i) Aluminium Oxide
(b) Ceramic	(ii) Cobalt, Tungsten and Carbon
(c) Cemented carbide	(iii) Chromium-Tungsten-Vanadium-Iron
(d) High speed steel	(iv) Chromium-Cobalt-Tungsten-Carbon-Iron

124. Match the cutting speed with respect to the tool materials

Group-A	Group-B
(a) Ceramic	(i) 30 m/min.
(b) Cemented carbide	(ii) 60 m/min.
(c) H.S.S.	(iii) 150 m/min.
(d) Cast-non-ferrous stellite cobalt	(iv) 600 m/min.

125. Match the hot hardness of cutting tool material w.r.t. different cutting tool materials

Group-A	Group-B
(a) Cemented carbide	(i) 1500°C.
(b) H.S.S.	(ii) 1200°C.
(c) Ceramic	(iii) 1000°C.
(d) Cast-non-ferrous-stellite cobalt	(iv) 900° C.

126. Match the application with respect to different cutting fluids normally used

Group-A	Group- B
(a) Soluble oil	(i) Soft steel operation
(b) Synthetic coolant	(ii) Lathe, drilling operation, etc.
(c) Compound oil	(iii) Grinding operations
(d) Sulphurised additive oil	(iv) Machining alloy steel.

127. Select the proper cutting fluid with respect to the job material for most of the operations

Group-A	Group-B
(a) Copper	(i) Blow of air
(b) Mild steel	(ii) Mineral lard oil
(c) Aluminium	(iii) Turpentine
(d) Cast-iron or brass	(iv) Kerosene
(e) Bronze or hard steel	(v) Cutting compound.

128. Match the statement from Gr. -B against the statement the Gr. -A

Group-A	Group-B
(a) Self-drive	(i) One motor is responsible for different machines
(b) Group drive	(ii) One motor is responsible for one machine
(c) Multipoint cutting tool	(iii) Twist drill
(d) Double cutting edges	(iv) Reamer

129. Match the statement in Gr.-B w.r.t. Gr.-A

Group-A	Group-B
(a) Sodium nitrate	(i) Grinding operations
(b) Solid lubricants	(ii) Soap bar or wax stick
(c) Cutting oil	(iii) Automatic machines
(d) Synthetic coolant	(iv) Rust preventer

130. Match the cutting fluid w.r.t. their functions

Group-A

- (a) As coolant
- (b) As lubricant
- (c) As both coolant and lubricant
- (d) As flashing action

Group-B

- (i) Air, water
- (ii) To wash-off chips
- (iii) Mineral oil, vegetable oil, animal oil
- (iv) Mixed oil, emulsion of oil and

131. Match the tool angles for machining M.S., M.C.S. and alloy steel by H.S.S. cutting tool

Group-A

- (a) Front rake angle
- (b) Side rake angle
- (c) Front clearance angle
- (d) Side cutting edge angle

Group-B

- (i) 6 degree
- (ii) 12 degree
- (iii) 9 degree
- (iv) 18 degree.

132. Match the cutting speed in m/min. for turning, drilling, boring, milling operations, etc., with respect to different job materials

Group-A

- (a) Mild steel
- (b) Cast-iron
- (c) Brass
- (d) Stainless steel and high carbon steel
- (e) Aluminum

Group-B

- (i) 80 to 100
- (ii) 50 to 70
- (iii) 25 to 30
- (iv) 15 to 25
- (v) 15.

133. Match the type of chip with respect to the job material

Group-A

- (a) Continuous
- (b) Dis-continuous
- (c) Continuous with built-up edge

Group-B

- (i) Cast-iron
- (ii) Mild steel with appropriate cutting conditions
- (iii) Mild steel without using cutting fluid and high cutting speed and feed.

134. Match the tool used with respect to different M/c tools

Group-A

- (a) Single-point cutting tool
- (b) Double edges cutting tool
- (c) Multi-point cutting tool

Group-B

- (i) Drilling M/c
- (ii) Milling M/c, grinding M/c
- (iii) Lathe, Shaper, Planer.

2. Fill up the blanks:

1. In _____ operation, job rotates and tool moves in forward translation.
2. _____ speed is necessary for operations like spinning, polishing, wood working, etc.
3. _____ lathe is the high speed heavy duty machine tools suitable for mass-production.
4. Main specifications of a centre lathe are _____ diameter over bed and _____ of bed.
5. _____ is the lathe part, which gives rigid supports to the tool during operations and transmit power through Feed rod and Lead screw.
6. All geared head is mostly suitable in _____ duty machines and where smooth running is required.
7. Front portion of the carriage is known as _____
8. _____ of a machine tool are the essential components, without which that particular machine cannot be identified.
9. _____ are required for holding and supporting the working job or the cutting tool conveniently.
10. _____ are intend to increase the accuracy and efficiency of the machine for specific purpose.
11. _____ centre is in tailstock end for. supporting heavy job rotating at high speed.
12. _____ chuck is suitable for holding of repetition or heavy and large jobs on lathe machine spindle.
13. _____ are used to prevent bending of a slender job due to its own weight.
14. ----- is used for holding and rotating the hollow jobs on machine spindle.
15. In _____ operation, the job rotates and the tool is fed longitudinally by giving the desired depth of cut.
16. Lathe bed is made of _____ iron.
17. Lead screw of a lathe has _____ start thread.

State whether the following statements are True or False:

18. Operations like turning, facing, drilling, etc., are required moderate speed.
19. Operations like knurling, thread cutting, etc., are required high speed.
20. Horizontal lathe machines are those in which spindle axis is horizontal.
21. In automatic lathe, job will be fed from one side and finished product will come-out from the other side of the machine during running without the help of a operator.
22. In automatic lathe, all the operations are performed by the machine itself without the participation of the operator.
23. Bed of a lathe machine is made from mild steel.
24. Morse tapers are used in live and dead centres.
25. In stepped pulley drive, spindle speeds are varied in Arithmetic Progression.
26. In all geared head drive, spindle speeds are varied in Geometric Progression.
27. Full-proof arrangement is a safety arrangement against simultaneous engagement of half nuts and longitudinal or cross feed.
28. Chucks, steady rests, driving plate, carriers are the examples of lathe parts.
29. Taper turning attachment, dividing head attachment, feed stop, etc., are the accessories of lathe machine.
30. If the centre is mounted on headstock and rotated with it is known as live centre.
31. Ball centre is used during taper turning by off-setting the tailstock to minimise wear and strain.

32. Three-jaws-self-centering chuck is used to hold slender jobs with smaller diameter.
33. Collet chuck is used for production work to hold the bar type of jobs up to 65 mm diameter.
34. Magnetic chuck is only used in non-magnetic material jobs for light and thin sheet operation by grinding.
35. Face plate is a circular disc or plate with several rectangular slots placed radially for clamping the job by bolts, angle plate, clamps, etc.
36. Gang mandrel is suitable to drive the jobs having larger diameter holes more than 100 mm.
37. Steady rests are placed with an interval of 120 to 150 cm of the job length to prevent sag or deflection.
38. Follower rest has 3 jaws support 120° apart and makes the job to move concentric.
39. Catch plate imparts a positive drive between lathe spindle and job.
40. Universal chuck is mainly used for irregular jobs and giving better gripping.
41. Centering operation is the operation of producing conical holes on job face(s) to make the bearing support by the lathe centre(s).
42. Knurling is the process of embossing, producing a roughened surface on a smooth surface of a cylindrical job to provide effective gripping.
43. Reaming, a single-point cutting tool will not follow the previous drilling hole and will trace its own path.
44. In taper turning by swivelling the compound rest, the job rotates on lathe axis and tool moves in angular path.
45. In taper-turning by taper turning attachment, job rotates on lathe axis and tool travels on resultant path.
46. In taper-turning by a form tool, job rotates on lathe axis and tool move; cross-wise direction, perpendicular to the lathe axis.
47. Lead is equal to the product of pitch and number of start.
48. Change gear ratio in thread cutting operation is equal to the ratio of the product of pitch of the job and number of start to the pitch of the lead screw.
49. Half-nut is used to engage the lathe carriage to the lead screw for screw cutting.
50. When back gears are used in a centre lathe, the spindle speed reduces considerable.
51. The carriage and tailstock of a lathe is guided on different spindles.
52. The lathe spindle is usually made hollow and front portion is provided with internal morse taper.
53. The tool should be set properly at the centre height of the job.
54. When the tool is set below the centre height, of the job the clearance angle is decreased.
55. The elements of hand reamer are body, neck, shank and body also consists of chamfer, starting taper, sizing section and back taper.
56. Swing diameter over bed is less than the swing diameter over carriage.
57. Half nut is also known as lock nut to transmit the lead screw power to tool end during thread cutting.
58. In turning operation, the spindle speed decreases with decrease in diameter of the work.
59. An operation of enlarging the end of a hole conically is known as counter-sinking.

Choose the correct one from the alternatives given below against each question:

60. In an Engine Lathe, the cutting tool is fed against workpiece axis in: (i) Longitudinal direction only (ii) Cross direction only (iii) Both longitudinal and cross directions (iv) Vertical direction only.
61. Two main specifications of a centre lathe is: (i) Swing diameter over bed and length of bed (ii) Swing diameter over bed and carriage (iii) Speed and feed ranges (iv) Swing diameter over bed and maximum length of the job can accommodate in between centres.
62. A Centre Lathe is specified by: (i) The swing diameter over bed (ii) The length of bed (iii) The diameter of the hole in H.S. spindle (iv) All of the above.
63. Slow speed in head-stock spindle is necessary in: (i) Spinning (ii) Turning (iii) Thread cutting (iv) Knurling (v) Both (i) and (ii) (vi) Both (iii) and (iv).
64. Standard taper used in Lathe centres is: (i) Brown and Sharp (ii) Morse (iii) Jarno (iv) Metric taper.
65. A Lathe machine having four-steps cone pulley drive with one back gear will have:
(i) Eight direct speeds (ii) Four direct speeds (iii) Eight indirect speeds (iv) Four direct and four indirect speeds.
66. When a turning tool travels parallel to the Lathe axis, the movement of tool is known as:
(i) Longitudinal feed (ii) Cross feed (iii) Angular feed (iv) None of the above.
67. The included angle of Lathe centres for general work is:
(i) 25° (ii) 40° (iii) 60° (iv) 75°.
68. The different H.S. spindle speed of all geared-head drive on a lathe form:
(i) Harmonical progression (ii) Arithmetical progression (iii) Geometrical progression (iv) None of the above.
69. An operation of embossing, producing a roughened diamond-shaped pattern on a smooth surface of a cylindrical job to provide effective gripping is known as:
(i) Grooving (ii) Knurling (iii) Turning (iv) All of the above.
70. The cutting edge width of a parting off tool varies from
(i) 4-16 mm (ii) 8-25 mm (iii) 15-35 mm (iv) 3-8 mm.

Match the correct answer from group 'B' against statement given in group 'A':

71. Match the functions of Lathe parts

Group-A

Group-B

- | | |
|----------------|---|
| (a) Bed | (i) Main source of power, transmits power to feed rod and lead screw. |
| (b) Headstock | (ii) Sufficiently rigid and good damping qualities |
| (c) Tailstock | (iii) Rigid supports, moves and controls the cutting tool |
| (d) Carriage | (iv) Holds other end of the job, performing drilling, boring, reaming, taper for long jobs. |
| (e) Feed rod | (v) Transmit power for thread cutting operation |
| (f) Lead screw | (vi) Transmit power to the tool end for automatic longitudinal and cross feeding. |

72. Match the statement of different transmission system in Lathe machine

- | | |
|---------------------------|---|
| Group-A | Group-B |
| (a) Stepped pulley | (i) Device used to change direction of rotation of headstock-spindle to feed rod and lead screw. |
| (b) All geared head drive | (ii) Number of spindle speed increases in arithmetic progression. |
| (c) Back gear drive | (iii) Number of speed increases in geometric progression |
| (d) Tumbler gear | (iv) Reduces speed and number of speeds will be doubled |
| (e) Apron mechanism | (v) Device by which the rotary movement of feed rod can be converted to longitudinal and transverse motion of the tool. |

73. Match the statement in Gr.-B w.r.t. Gr.-A

- | | |
|-----------------|--|
| Group-A | Group-B |
| (a) Parts | (i) Additional equipments such as feed stop. |
| (b) Accessories | (ii) Holding and supporting the workpiece such as chucks, steady rest, mandrel, etc. |
| (c) Attachment | (iii) Essential components such as tailstock bed, etc. |

74. Match the centre with respect to their application

- | | |
|-------------------------|---|
| Group-A | Group-B |
| (a) Half Centre | (i) Mostly used in production work and expensive |
| (b) Ball Centre | (ii) For supporting heavy job rotating at high speed |
| (c) Pipe Centre | (iii) To allow more space for the tool when turning down the end |
| (d) Tipped Centre | (iv) Minimizes wear and stain during taper turning by tailstock set-over method |
| (e) Frictionless Centre | (v) For holding hollow jobs such as shell, pipe, etc. |

75. Match the functions of different chucks used in Lathe machine

- | | |
|--|---|
| Group-A | Group-B |
| (a) 2-jaw chuck | (i) Used to hold magnetic material for light, and thin sheet operation |
| (b) 4-jaw independent chuck | (ii) Used to hold heavy and irregular-shaped work rigidly |
| (c) 3-jaw concentric or self centering chuck | (iii) Used for holding heavy and large jobs of production work. |
| (d) Magnetic chuck | (iv) Used for holding regular -shaped job |
| (e) Air or oil operated chuck | (v) Used to hold small job and small stock removal like polishing, etc. |

76. Choose mandrel with respect to their functions

- | | |
|--------------------|---|
| Group-A | Group-B |
| (a) Step Mandrel | (i) Suitable for the jobs having different hole diameter |
| (b) Gang Mandrel | (ii) Used to drive the jobs having internal threads |
| (c) Collar Mandrel | (iii) Suitable for production work for holding number of identical jobs at a time |
| (d) Cone Mandrel | (iv) Suitable for to drive the jobs having larger diameter holes more than 100 mm |
| (e) Screw Mandrel | (v) Used to drive different jobs of different sizes of holes at a time |

77. Match the different Lathe operations

- | | |
|----------------------|---|
| Group-A | Group-B |
| (a) Reaming | (i) Operation of making the ends of a job to produce a flat surface square with axis of operation |
| (b) Boring | (ii) Operation of producing a cylindrical surface of a job by removing excess material |
| (c) Straight turning | (iii) The operation of enlarging an existing hole by turning inside with some form tool |
| (d) Facing | (iv) Operation of sizing or finishing a drilled hole to the required size by means of a tool. |

78. Match the different taper-turning methods in Lathe Machine with respect to their principles of taper-turning

- | | |
|---|--|
| Group-A | Group-B |
| (a) Taper-turning by swivelling the compound rest | (i) Job rotates on lathe axis and tool moves in guided angular path |
| (b) Taper-turning by offsetting the tail-stock | (ii) Job rotates on lathe axis and tool moves cross-wise direction |
| (c) Taper-turning by taper turning attachment | (iii) Job rotates on lathe axis and tool moves in angular path |
| (d) Taper-turning by a form tool | (iv) Job rotates at an angle to the lathe axis and tool travels longitudinally to the lathe axis |
| (e) Taper-turning by combination feeds | (v) Job rotates on lathe axis and tool travels on resultant path. |

79. Match the different taper-turning methods with respect to their applications

- | | |
|-------------------------------------|---|
| Group-A | Group-B |
| (a) By swivelling the compound rest | (i) Longer jobs of steep angle in mass production |
| (b) By off-setting the tailstock | (ii) Mass production for chamfering on bolts nuts, bushes, etc. |
| (c) By taper-turning attachment | (iii) Longer jobs and small tool angle of taper |
| (d) By a form tool | (iv) By hand feeds for making the ball of a hammer |
| (e) By combination feeds. | (v) Shorter length and steeper angle. |

80. Match the units with respect to different cutting conditions used in Lathe Operations

- | | |
|-------------------|--------------|
| Group-A | Group-B |
| (a) Cutting speed | (i) mm |
| (b) Feed | (ii) mm/rev. |
| (c) Depth of cut | (iii) m/min. |

(d) R.P.M.

(iv) Revolution/min.

3. State whether the following statements are True or False:

1. In Capstan Lathe, hexagonal turret rests directly on a saddle, which can move both the ways, i.e., along bedways and transverse directions.
2. In Turret Lathe, the hexagonal turret rests on a short slide or ram. which slides on saddle. The saddle can move on lathe bedways.
3. In bar feeding arrangement, the bar in Capstan Lathe is pushed forward immediately after releasing the collet without stopping the Lathe machine.
4. Collets are used for gripping small bars in Capstan and Turret Lathes of mass production work.

4. Fill up the blanks:

1. _____ is being done both for surface finish and also for enlargement of the hole.
2. Systematic naming of different elements of a twist drill and showing of different angles are known as twist drill _____ and _____.
3. The operation of producing a large hole by removing metal along the circumference of a hollow cutting tool is known as _____.
4. The operation of finishing relatively large holes such as automobile; cylinders by means of relatively slow moving abrasives is known as _____.
5. Machining time in minute is ratio of total travel of drill to the product of spindle speed and the _____.
6. The tool used to withdraw a drill from the sleeve is called _____.
7. One or more _____ (s) is used as a media to hold the twist drill into the spindle.
8. Only one _____ is used as a media to hold the twist drill into the spindle.
9. _____ holder is used to compensate for non-alignment of drill spindle with work and permits self-alignment of the tool.

State whether the following statements are True or False:

10. In drilling operation, job is fixed and the drill bit is rotating and feeding vertical translatory movement
11. In super-sensitive and sensitive drilling machine, drill spindle is running at very low speed and automatic feed with diameter over 16 mm.
12. In Ratchet drilling machine, drill bit is hand operated, lever length limited range 300 to 600 mm rod and length of feed range 60 to 85 mm.
13. Drift is used for taking out the socket or sleeve or twist drill or drill chuck from the spindle by driving it into the key slot.
14. Spot-facing is an operation of smoothening and squaring around the top surface of the hole.
15. Reaming speed is generally less than the drilling speed.
16. A short taper lead is to be selected on machine reamer for tough and soft material or blind holes.
17. Over-all length of machine-jig reamer consists of guide length, cutting edge length and shank length.
18. The hole drilled for tapping should be smaller than the tap size by the depth of thread.
19. Point angle of a twist drill for general purpose is 118°.
20. Helix angle of a drill for drilling Aluminium is more than 30°.

Choose the correct one from the alternatives given below against each question:

21. The metal is removed in drilling machine by:

- | | |
|------------------------------|--------------------------------|
| (i) Extrusion | (ii) Shearing |
| (iii) Shearing and Extrusion | (iv) Shearing and Compression. |

22. Name the machine tool in which work is usually rotated while the drill bit is fed into the work:

- | | |
|------------------------------|---------------------------------|
| (i) Radial drilling M/c | (ii) Multi-spindle drilling M/c |
| (iii) Deep hole drilling M/c | (iv) Gang drilling M/c. |

23. The operation of producing a large hole by removing metal along the circumference of a hollow cutting tool is known as:

- | | |
|--------------------|----------------------|
| (i) Counter-boring | (ii) Counter-sinking |
| (iii) Trepanning | (iv) Spot-facing. |

24. A 50 mm Drilling Machine means that the machine can drill a hole:

- | | |
|---------------------------------|---|
| (i) In 50 mm thick plate | (ii) Having cross-section area of drill hole of 50 mm |
| (iii) Of maximum diameter 50 mm | (iv) None of the above. |

25. The tool necessary to withdraw a drill bit from the drilling machine spindle or sleeve is known as:

- | | | | |
|------------------|-------------------|------------------------|-------------|
| (i) Drill drawer | (ii) Drill puller | (iii) Drill withdrawal | (iv) Drift. |
|------------------|-------------------|------------------------|-------------|

26. The twist drill bit is mostly made of:

- | | | | |
|-----------------------|-----------------------|------------------------|---------------|
| (i) High carbon steel | (ii) High speed steel | (iii) Cemented carbide | (iv) Ceramic. |
|-----------------------|-----------------------|------------------------|---------------|

27. The value of depth of cut in drilling with respect to drill diameter is:

- | | | | |
|------------|------------|----------------|------------------|
| (i) Double | (ii) Equal | (iii) One-half | (iv) One-fourth. |
|------------|------------|----------------|------------------|

28. Tap size drill is _____ the outside diameter of the thread on the tap:

- | | | | |
|------------------|-------------------|----------------|-------------------------|
| (i) Greater than | (ii) Smaller than | (iii) Equal to | (iv) None of the above. |
|------------------|-------------------|----------------|-------------------------|

Match the correct answer from group B against statement given in group A:

29. Match the different drilling machines with respect to their operation and suitability

Group -A

Group-B

(a) Flexible shaft drilling M/c

(i) A drilling M/c operated by compressed air, mostly used in mines,

- roads, etc., are to crack
- (b) Electric drilling M/c (ii) Manually operated drilling M/c is mostly suitable where electric power is not available
- (c) Ratchet drilling M/c (iii) Operated by hand power, pneumatic power or electric power (AC or DC) suitable for high speed non-productive jobs
- (d) Air drilling M/c (iv) Operated by electric power, and can be moved elsewhere
- (e) Portable drilling (v) Similar to portable electric drilling M/c but the shaft is long and flexible.

30. Match the different drilling machines with respect to their main functions

Group-A

(a) Radial drilling M/c

(b) Gang drilling M/c

(c) Multi-spindle drilling M/c

(d) Deep hole drilling M/c

Group-B

(i) For drilling very long holes of smaller diameter and suitable in production work

(ii) Number of identical holes is drilled at a time and suitable for production work

(iii) For medium to large and heavy jobs to drill at any angle and mostly suitable in tool room and maintenance work

(iv) Series of operations are performed by minimum movement of job on common work table and mostly suitable for production work.

31. Match the approximate range of angles in degree of a twist drill

Group-A

(a) Rake or Helix angle

(b) Chiesel edge angle

(c) Lip clearance angle

(d) Point angle

Group-B

(i) 80° to 150°

(ii) 8° to 12°

(in) 120° to 135°

(iv) 30°

32. Match the statements of different angles of a twist drill with respect to their name

Group-A

(a) Point angle

(b) Chiesel Edge angle

(c) Helix or Rake angle

(d) Lip clearance angle

Group-B

(i) The obtuse angle, included between chiesel edge and the lip viewed from the end of a drill.

(ii) The angle included in the conical part of a twist drill.

(iii) The angle, formed by the flank and a plane at a right angle to the drill axis.

(iv) The angle formed by the leading edge of the land with a plane having the axis of the drill.

5. Fill up the blanks:

- _____ is the extension of milling machine spindle on which all the various cutters are mounted.
- _____ machine in which the metal is removed from a workpiece to obtain the required shape by a multi-point rotating cutter fixed on machine spindle.
- _____ is mounted on the upper part of the milling machine column and received power from the motor, can be rotated at different speeds.

State whether the following statements are True or False:

- In universal milling machine table can have the swivelling arrangement about a vertical axis.
- In omniversal milling machine has the arrangements of knee swivelling in addition to the movement of the table as in case of universal milling machine.
- Plain milling machine is less rigid than universal milling machine and so not suitable for production purpose.

Choose the correct one from the alternatives given below against each question:

- In plain milling machine table can be moved against a rotating cutter mounted on arbor:
 - Vertically
 - Longitudinally
 - Cross-wise
 - All of the above.
- Milling cutter is mounted on:
 - Spindle
 - Tool post
 - Arbor
 - Table
- In which of the following milling machines is most suitable for production work?
 - Universal milling machine
 - Triplex type (Fixed Bed) milling machine
 - Omniversal milling machine
 - Plain milling machine.
- In which of the following milling machines is most suitable for versatility of works?
 - Universal milling machine
 - Fixed bed type milling machine
 - Omniversal milling machine
 - Plain milling machine.
- Select the machine tool in which the forward movement of the work-piece in longitudinal, cross or vertical direction fed against the rotating cutter:
 - Lathe
 - Drilling
 - Broaching
 - Milling.
- In which milling machines is most suitable in Tool-Room Operations:
 - Plain milling machine
 - Universal milling machine
 - Omniversal milling machine
 - Fixed bed type milling machine.
- Milling machine is mainly specified by:
 - Manufacture type and code number
 - Diameter of arbor and table size with movements
 - Range and number of spindle speeds and table feeds
 - Net weight, floor space and kW of the motor.
- Select the milling machine most suitable for helical gear cutting:
 - Plain milling machine
 - Hand milling machine
 - Universal milling machine
 - None of the above.
- Select the milling machine cutter holding device:
 - Arbor
 - The spring collet
 - Screw on arbor
 - All of the above.
- The space between the back of one tooth and face of the subsequent tooth in a plain milling cutter is known

as: (i) Face (ii) Fillet (iii) Gash (iv) None of the above.

17. The curved surface at the bottom of the chip space which joins the back of tooth to the face of the next tooth is known as: (i) Gash space (ii) Chip space (iii) Fillet (iv) None of the above.

18. The process of removing metal by a milling cutter, which is rotated against the direction of the feed of the workpieces: (i) Face milling (ii) Up milling (iii) End milling (iv) Down milling.

19. The process of removing metal by a milling cutter, which is rotated in the same direction as the feed of the workpiece: (i) Face milling (ii) Conventional milling (iii) Up milling (iv) Climb milling.

20. Cutting forces in down milling operation _____ per tooth movement of the cutter.

(i) Is uniform (ii) Is minimum (iii) Decreases from maximum (iv) Increases from zero to zero maximum.

21. Cutting forces in up milling operation _____ per tooth movement of the cutter:

(i) Is uniform (ii) Varies from maximum to zero (iii) Varies from zero to maximum (iv) Is minimum.

22. For milling 13 teeth on a gear blank, the index crank to move

(i) 3 complete turns and 1 hole on 39 hole circles of I.P. no. III

(ii) 3 complete turns and 3 holes on 39 hole circles of I.P. no. III

(iii) 3 complete turns and 6 holes on 39 hole circles of IP. no. III

(iv) 3 complete turns and 9 holes on 39 hole circles of I.P. no. III.

23. For milling 49 teeth on a gear blank, the index crank to move

(i) 10 holes on 49 hole circles of I.P. no. III

(ii) 20 holes on 49 hole circles of I.P. no. III

(iii) 30 holes on 49 hole circles of I.P. no. III

(iv) 40 holes on 49 hole circles of I.P. no. III.

Match the correct answer from group B against statement given in group A :

24. Match the statements in Gr. B with Gr. A of milling operations

Group-A

Group-B

(a) Conventional milling

(i) UD-milling

(b) Climb milling

(ii) Same direction

(c) Job-Tool motion in up milling

(iii) Opposite direction

(d) Job Tool motion in down milling

(iv) Down milling.

25. Match only one answer from Gr.-B with respect to statement is Gr.-A of milling operation

Group-A

Group-B

(a) Cutting forces varies from zero to maximum

(i) Down milling

(b) Difficult to use of cutting fluid in milling process

(ii) Conventional milling

(c) Cutter forces sufficiently on the job to press downwards

(iii) Up milling

(d) Better surface finish if the table is free from back lash error

(iv) Climb milling.

6. Fill up the blanks:

1. _____ machine is used to machine 900 mm cube maximum size among reciprocating type of machine tools.

2. maximum size of a block can be machined by a shaping machine.

State whether the following statements are True or False:

3. In shaping operation, job reciprocates and tool giving in linear motion.

4. The overhang portion of the shaper tool should be kept as minimum as possible.

5. In universal shaping machine, in addition to the two movements as in plain type machine, the table can be swivelled and tilted to permit machining at any angle.

6. In draw cut type shaping machine, the metal is removed from the job during the forward motion of the ram.

7. In plain type shaping machine, the table holding job permits only two movements either in horizontal or in vertical for giving desired feed.

8. For production work, a horizontal, plain and push cut type shaper is commonly used.

9. For tool room and maintenance works, a horizontal tool travel universally and push cut type shaper is mostly suitable.

10. Draw cut type machine is mostly used as conventional cutting for standard and universal type horizontal shaper.

11. In travelling tool head type machine, the ram holding the tool during reciprocation, can move cross-wise for required feeding while the job will remain stationary.

12. Cutting-return ratio is fixed in a particular planning machine.

13. Cutting-return ratio in case of a shaper can be changed independently.

Choose the correct one from the alternatives given below against each question:

14. Choose the machine tool in which tool reciprocates in horizontal axis and job feeds in intermittent translatory motion

(i) Slotting machine (ii) Shaping machine (iii) Planning machine (iv) None of the above.

15. Choose the machine tool in which job reciprocates in horizontal axis and tool feeds in intermittent translatory motion

(i) Slotting machine (ii) Shaping machine (iii) Planing machine (iv) None of the above.

16. Choose the machine tool in which tool reciprocates in vertical axis and job feeds in intermittent translatory motion

(i) Slotting machine (ii) Shaping machine (iii) Planning machine (iv) None of the above.

17. In an universal planer metal is removed during

(i) Forward strokes (ii) Return strokes (iii) Both forward and Return strokes (iv) None of the above

18. Choose the Machine Tool, in which the ram holding the tool travels in a vertical direction can be adjusted 10°

on either side on its vertical axis for machining an inclined surface, the addition to its vertical direction

(i) Shaper (ii) Slotter (iii) Both of them (iv) None of them.

19. Select the machine in which three surfaces can be machined at a time

(i) Open housing planer (ii) Double housing planer (iii) Pit planer (iv) Edge or plate planer.

Match the correct answer from group-B against statement given in group A:

20. Match the statement in Gr.-B w.r.t. Gr.-A of reciprocating type of machines in relation to their construction and rigidity

Group-A

(a) Shaping machine

(b) Slotting machine

(c) Planing machine

Group-B

(i) Heavier in construction and more rigid

(ii) Lighter in construction and more rigid than vertical shaper

(iii) Lighter in construction and less rigid.

21. Match the cost relation of the respective machine tools in Gr.-B w.r.t. Gr.-A

Group-A

(a) Shaping machine

(b) Slotting machine

(c) Planing machine

Group-B

(i) Cost most

(ii) Cost more

(iii) Cost moderate.

22. Match the special features of different planing machines

Group-A

(a) Open side planer

(b) Double housing planer

(c) Pit planer

(d) Edge or Plate planer

(e) Divided table planer

Group-B

(i) Carriage holding the cutting tool moves to and fro past the stationary workpiece

(ii) Two parts of the table is reciprocated separately or together

(iii) Having only one column on one side of the base

(iv) Having two columns at two sides of the base

(v) Table stationary and column carrying the cross-rail holding tool head(s) can reciprocate on horizontal rails situated on both sides of the table.

23. Match special features of different shaping machines

Group-A

(a) Horizontal shaper

(b) Vertical shaper

(c) Travelling tool head shaper

(d) Universal shaper

(e) Push cut type shaper

Group-B

(i) Metal is removed from the job during the forward motion of ram

(ii) The table can also be swivelled and tilted to permit machining at an angle

(iii) Ram holding the tool during reciprocation can move crosswise

(iv) Ram holding the tool travels in horizontal axis

(v) Ram holding the tool travels in vertical directions.

24. Match the main specifications in relation to different reciprocating machine tools

Group-A

(a) Shaper

(b) Slotter

(c) Planer

Group-B

(i) Maximum length of stroke and diameter of the table

(ii) Maximum length stroke of tool table movement horizontally and vertically

(iii) Maximum length of stroke and width of the table and distance from the table to rail.

7. Fill up the blank:

1. The main dimensions of a _____ are the maximum length of stroke of the ram and the diameter of the table.

8. Fill up the blanks:

1. _____ machine is used to machine 3 m x 3 m x 18.25 m rectangular block maximum size among reciprocating type of machine tools.

2. _____ maximum size of a block can be machined by a planing machine.

9. Fill up the blanks:

1. _____ is a process of removing materials in the form of chips from a workpiece by mechanical action of many small abrasive particles bonded together in a wheel.

2. An _____ is a hard material which can be used to cut or wear away by abrasion to other materials.

3. _____ is the degree of hardness of the bond and is designated by the letter of alphabet.

4. _____ indicates the size of the cutting teeth or the size of the abrasive particles used in making a grinding wheel.

5. The relative spacing of abrasive grain is known as _____ and denoted by the number of cutting edges per unit area of wheel face.

6. Degree of hardness caused by the _____ is called the grade of the wheel.

7. _____ bond is suitable for maximum metal removal and 75% of the total use.

8. _____ bond is used for good surface finish and roll finish.

9. _____ bond is used for general purpose and diameter of grinding wheel is limited to 915 mm.

10. _____ bond is used for diameter up to 1525 mm and small amount of metal removal as knife, tool, etc.

11. _____ bond is for extremely thin sheets, best finish, and for serious bending at high surface speed.

12. _____ a wheel is the operation to create a true and concentric surface with the wheel spindle axis.

13. _____ a wheel is the operation to remove glaze or other adhesion particles and to expose fresh cutting particles.

14. Commercial _____ tool is used for turning and dressing the newly manufactured grinding wheel.

State whether the following statements are True or False:

15. A grinding wheel is designated or specified by a line with letters and figures which show the characteristics of a wheel.
16. Silicon carbide abrasive is suitable for materials of high speed steel, tool steel, steel casting.
17. Aluminium oxide abrasive is used for materials of cemented carbide.
18. In selecting grade, harder wheel is used for softer materials.
19. In selecting grade, softer wheel is used for harder materials.
20. Dense structure is used for finishing cuts of brittle and hard materials.
21. Open structure is used for heavy cuts of soft and ductile materials.
22. Centreless grinder is suitable for production purpose.
23. Centre type or cylindrical grinder is suitable for general purpose.
24. Centre type or cylindrical grinder is a continuous process of cylindrical surface grinding.
25. Centreless type of grinder is intermittent process of cylindrical surface grinding.
26. The same diamond pointed tool is used for both the operations of truing and dressing but not for same purpose.

Choose the correct one from the alternatives given below against each question:

27. For production of finishing of flat and plane surfaces on a workpiece the method of grinding is (i) External cylindrical grinding (ii) Internal cylindrical grinding (iii) Surface grinding (iv) Universal type tool grinding.
28. Principle of operation of finishing flat surfaces by surface grinders: (i) Grinding by horizontal spindle on reciprocating table (ii) Grinding by horizontal spindle on rotary table (iii) Grinding by vertical Spindle on reciprocating table. (iv) Grinding by vertical spindle on rotary table (v) All of the above.
29. Select the grinder mostly used to sharpen and reconditioning various types of cutters, die, jig, fixture, light surface, cylindrical and internal surfaces etc.
(i) Surface grinder (ii) Cylindrical grinder (iii) Tool and cutter grinder (iv) None of the above.
30. Select the grinder in which work is not secured between centres or in a chuck or on any fixture, but the workpiece is supported by using two wheels and a work-rest (i) External cylindrical grinder (ii) External surface by centreless grinder (iii) Surface grinder (iv) Internal surface by centreless grinder.
31. Which factor(s) effect(s) the selection of the grinding wheel?
(i) Abrasive (ii) Grain size (iii) Grade (iv) Structure . (v) Bonding (vi) All of the above (vii) None of the above.
32. Which factor(s) effect(s) the rejection of the grinding wheel? (i) Wheel speed (ii) Work speed (iii) Work material (iv) Area of contact (v) None of the above (vi) All of the above.
33. Newly manufactured wheels taken from kilns needs to shape and dimensions by
(i) Turning (ii) Dressing (iii) All of the above (iv) None of the above.
34. Degree of hardness of the bond in a grinding wheel is designated by (i) Brinell hardness number (ii) Rockwell hardness number (iii) Vickers pyramid number (iv) Letters of alphabet.
35. The choice of grain size depends on (i) The nature of grinding operation (ii) The work material (iii) The material removal rate (iv) Surface finish desired (v) All of the above.
36. The process to expose fresh cutting action by removing glaze or adhesion particles is called by
(i) Clearing (ii) Dressing (iii) Turning (iv) Facing.
37. The process to create a true and concentric surface of the grinding wheel with the wheel spindle axis is called by (i) Clearing (ii) Dressing (iii) Truing (iv) Facing.

Match the correct answer from group B against statement given in group A

- | | |
|----------------------|----------|
| Group-A | Group-B |
| (a) Tool steel | (i) 80 |
| (b) High speed steel | (ii) 46 |
| (c) Tungsten carbide | (iii) 36 |
38. Choose the grain size w.r.t. different tool materials
 39. Match the statement for selecting of bonding in Gr. B w.r.t. Gr. A

Group-A	Group-B
(a) Vitirified	(i) For precision grinding cams, rolls for high finish and high speed snagging of castings
(b) Silicate	(ii) For wheel diameter up to 1525 mm and small amount of metal removal
(c) Rubber	(iii) For general work and wheel diameter up to 915 mm and maximum metal removal.
(d) Synthetic resinoid	(iv) For extremely thin sheets, best finish and for serious bending at high surface speed.

10. Fill up the blanks:

1. _____ is the operation of machining metal by means of a tool having a number of teeth gradually increasing in size.
2. Main specifications of a broaching machine are maximum _____ and maximum _____ developed by the slide.
3. Machining time in broaching operation is the ratio of length of broach to the _____.
4. _____ surfaces or _____ holes cannot be broached.
5. High accuracy and surface finish of about _____ mm is possible in broaching operations.
6. Broaching is _____ cutting edge(s) tool.
7. Cost of broach tool is very _____.
8. Semi-finishing teeth of a broach removes _____ metal.
9. Roughing teeth of a broach removes _____ metal.
10. Finishing teeth of a broach removes _____ metal.

11. Broach is a tool provided with multi-cutting edges, generally made of _____.
12. Sufficient _____ must be used to perform cooling of workpiece and broach tool, to reduce friction and flashing of the chips.
13. Rise per tooth in roughing teeth of a broach is approximately mm and cutting speed about _____m/min.
14. Hook or rake or face angle is about _____degree and back-off or clearance angle of about degree of a internal broach tool.

State whether the following statements are True or False:

15. Roughing, semi-finishing and finishing cuts are completed in one pass of the broach.
16. Obstruction surfaces or blind holes can be broached.
17. Broach is a single-purpose tool, requires different broaches for different shapes and sizes.
18. Broach has a single cutting edge and removes large amount of metal.
19. Height of the successive teeth of a broach is gradually decreasing in order.
20. Broaching operation is not suitable for mass production.
21. Broaching machine is designed to manufacture workpieces at a high rate and with satisfactory accuracy and finish.
22. Main specifications of a broaching machine are the maximum force developed by the slide and the maximum length of stroke.
23. During broaching operation, tool pulled or pushed while the job provides intermittent linear feed.
24. In machining by broaching, the machining time is the ratio of cutting speed to the length of broach travel.

Choose the correct one from the alternatives given below against each question:

25. The broaching operation in which the work is moved continuously past the stationary broach is called (i) Push broaching (ii) Pull broaching (iii) Continuous broaching (iv) Surface broaching.
26. The process of machining metal for finishing in one stroke either by pulling or pushing a cutting tool is known as: (i) Shaping (ii) Planing (iii) Forming (iv). Broaching.
27. The height of roughing teeth of a broach is: (i) In progressively increasing (ii) In progressively decreasing (iii) No change through-out (iv) None of the above.
28. The operation performed by finishing teeth of a broach is (i) Removed maximum metal (ii) Removed minimum metal (iii) Performed burnishing operation (iv) None of the above.
29. Broaching operation can be used (i) For mass production only (ii) For completing the machining in one pass only (iii) For high accuracy and surface finish (iv) All of the above.

Match the correct answer from group B against statement given in group A:

- | | |
|---|----------------------------------|
| 30. Match the metal removal rate of a broach w.r.t. type of cutting | |
| Group-A | Group-B |
| (a) Roughing teeth | (i) Perform burnishing operation |
| (b) Semi-finishing teeth | (ii) Removes maximum metal |
| (c) Finishing teeth | (iii) Removes minimum metal. |

11. Fill-up the blanks:

1. The boring machine is one of the most _____ machine tools.
2. Vertical boring machine is similar in job-tool motion as in vertical

State whether the following statements are True or False:

3. Boring Machine is designed for machining of large and heavy workpieces in mass production work of machine frame, cylinder machine housing etc.
4. In horizontal boring machine, the spindle holding the boring tool rotates in high precision bearings while workpiece mounted on table remains stationary.
5. In vertical boring machine, the tool rotates on horizontal table about a vertical axis and the job remains stationary.
6. Horizontal Boring machine requires less floor space than vertical boring machine.
7. The main specification of a vertical boring machine is the maximum diameter of the work that can be accommodated on the machine table.
8. In horizontal boring machine, tool head swivelling is possible.
9. In vertical boring machine work swivelling is possible.
10. In vertical boring machine, there is a turret type tool indexing arrangement.

Choose the correct one from the alternatives given below against each question:

11. The main specification(s) of a horizontal boring machine is(are) (i) Maximum size of boring spindle diameter (ii) Maximum spindle travel in horizontal and vertical directions (iii) Maximum travel of table in longitudinal and crosswise directions (iv) All of the above.
12. Which boring machine having the highest accuracy? (i) Precision boring machine (ii) Jig boring machine (iii) Deep hole boring machine (iv) Vertical boring machine.
13. Select the vertical boring machine operation(s) (i) Horizontal flat surface (ii) Internal and External taper turning (iii) Grooving (iv) Cylindrical turning (v) All of the above.
14. Select the operation(s) can be done by horizontal boring machine (i) Machining vertical flat surfaces (ii) Drilling operation (iii) Counter-boring (iv) An of the above (v) None of the above.
15. Number of cutting edge(s) can be used as cutter of a boring bar is (i) Single-point cutter (ii) Double-point cutter (iii) Multi-point cutter (iv) All of the above (v) None of the above.

16. Material for cutter mostly suitable for production work is
 (i) High speed steel (ii) Cemented carbide tips (iii) Cast non-ferrous-stellite cobalt (iv) All of the above.
17. Maximum spindle diameter of a horizontal boring machine is
 (i) 120 mm (ii) 220 mm (iii) 320 mm (iv) 400 mm.
18. Maximum diameter of machine table of a vertical boring machine is
 (i) 600 mm (ii) 900 mm (iii) 6000 mm (iv) 9000 mm
19. Boring tool is mounted on
 (i) Boring head (ii) Boring bar (iii) All of the above (iv) None of the above.

Match the correct answer from group B against statement given in group A

20. Match the three principal types of horizontal boring machine w.r. t their range of spindle diameter

Group-A	Group-B
(a) Floor type	(i) 50 to 125 mm
(b) Medium size	(ii) 100 to 200 mm
(c) Table type	(iii) 125 to 320 mm.

12. Fill up the blanks:

- Press is a metal _____ machine tool used for most cold working operations.
- Press tools are _____ and _____.
- In press bottom end of the ram holding the tool is _____ and top face of the bed holding the other tool is _____.
- During press operation, _____ of the two fly balls is equal to the useful work of the ram.
- In _____ press, the ram is driven by the crank-shaft and connecting rod and the crank-shaft gets power either by _____ or _____ means.
- The operation of cutting out to some desired shape from a metal strip or plate the cutting out portion is known as _____.
- The operation of making a hole of any desired shape in the blank portion is known as _____.
- The operation of forming of shapes on thick metal blank required severe compressive loads to cause metal now in cold state is known as _____.
- The main specifications of a press machine are maximum _____ and _____ travel.
- _____ is essential to make a fracture and also the space between the punch cutting edge and die cutting edge.
- In blanking operation, the clearance is provided on the _____.
- In piercing operation, the clearance is provided on the _____.
- In blanking operation, diameter of the punch is _____ than the diameter of die.
- In piercing operation, diameter of die is _____ than the diameter of the punch.

State whether the following statements are True or False:

- Progressive dies are faster operation than compound dies.
- Compound dies are open in tolerances than progressive dies.
- In progressive dies operations create more scraps than in compound dies operations.
- Labour cost in compound dies is less than the progressive dies.
- The operations to impart a raised or depressed fancy design on the surface of the blank material are known as embossing.
- In bending operation, the sheet metal takes the shape of a die.

Choose the correct one from the alternatives given below against each question:

- Presses are widely used to mass-production in the field of
 (i) Automotive (ii) Kitchen appliances
 (iii) Electrical goods (iv) Air-craft
 (v) Telephones (vi) All of the above
 (vii) None of the above.
- The squeezing operation of forming of shapes on thick metal blank for producing medals, etc., requires severe compressive loads to cause metal flow in cold state is called
 (i) Blanking (ii) Piercing (iii) Coining (iv) Latching.
- The operation of cutting out to some desired shape from a metal strip or plate, the cutting out portion is called (i) Blanking (ii) Piercing (iii) Coining (iv) Latching.
- The operation of making a hole of any desired shape in the blank, the blank portion is called
 (i) Blanking (ii) Piercing (iii) Coining (iv) Latching.
- If a desired shape is partially punched along a line in the work material and then bending down the non-cut portion, the combined action is called (i) Blanking (ii) Piercing (iii) Coining (iv) Latching.
- _____ dies can perform two or more press operations sequentially every time the ram descends.
 (i) Compound Die (ii) Simple Die (iii) Progressive Die (iv) Combination Die.
- _____ die can perform two or more operations in one stroke of the press at one station only.
 (i) Compound Die (ii) Simple Die (iii) Progressive Die (iv) Combination Die.
- Piercing and Blanking operations can perform simultaneously in a
 (i) Compound Die (ii) Simple Die (iii) Progressive Die (iv) Combination Die.
- Both cutting and non-cutting operations can perform at one station of the press in every stroke of the ram by
 (i) Compound Die (ii) Simple Die (iii) Progressive Die (iv) Combination Die.

Match the correct answer from group B against statement given I in group A :

30. Match the press accessories with respect to their functions

Group-A

- (a) Pilot
- (b) Stripper
- (c) Knock-out
- (d) Pressure Pad

Group-B

- (i) Forcing the cut-out blank from the die
- (ii) For correct location
- (iii) For preventing the blank from bowing away from the flat face of the punch.
- (iv) For removal of finished material.

13. Fill up the blanks:

1. _____ is the dimensional and positional relationship between the work-piece and the cutting tool.
2. _____ can hold and locate the workpiece and also guide the tool.
3. _____ can hold and position the workpiece but does not guide the tool.
4. Functions of _____ devices are to hold the workpieces rigidly on the fixtures or on the jigs.
5. _____ jigs are used to drill or ream radial holes on cylindrical or spherical workpieces.

State whether the following statements are True or False:

6. Jig is a device which can hold and locate the medium and heavier sized workpieces.
7. Fixture is a device necessary for holding and locating the small work pieces and also guiding the tool(s).
8. Less skill is essential during operation with jig w.r.t. fixture.
9. Fixtures are usually massive and heavier in construction and clamping rigidly on machine table.
10. Air-operated chuck can be constructed among angle plate, V-block, parallel, strips, etc., are the examples of jig.
11. Elements of fixture, are body, clamping and locating devices.
12. Elements of jig are body, clamping and locating devices and also tool guide.
13. Drill bush on clamping plate is used to guide the tool.

Choose the correct one from the alternatives given below against each question:

14. Advantages of using jigs and fixtures are mainly
 - (i) To-ensure interchangeability of finished products and minimizes the cost of inspection
 - (ii) To increase rate of production and operational accuracy
 - (iii) To avoid marking, setting, locating automatically and holding quickly
 - (iv) To minimize cost of assembly, operator s fatigue, labour cost, overall cost of product
 - (v) All of the above
 - (vi) None of the above.

14. Fill up the blanks:

1. Non-traditional machining methods can also be named as _____ machining methods.
2. _____ is a process in which tool vibrates at very high specific frequency and at small amplitude in non-traditional machining processes.
3. Abrasive slurry is the mixture of _____ grains and water.
4. Electro-chemical machining process operates on at _____ voltage and direct current.
5. Electrical discharge machining process operates on at _____ voltage and _____ direct current.
6. _____ among non-traditional machining processes is found suitable only when not feasible by the other methods of machining.
7. In LBM process the temperature and energy of density of the beam of light may extend to _____ K and _____ kW/cm³ at the workpiece end.
8. In ECM and EDM processes, the workpiece and tool material must be electrically _____.
9. MRR in ECM process, increased by _____ the gap between the work piece and tool and _____ the flow of current.

State whether the following statements are True or False:

10. Materials suitable for non-traditional machining, with respect to their qualities of high strength-to-weight ratios, high temperature resistance, hardness, etc.
11. Materials like hastalloy, Nitralloy. Titanium, HSTS, etc., can be easily machined by non-traditional machining.
12. In NTM, tool material must be harder than workpiece material.
13. In NTM, superior surface finish and burr free machining is possible.
14. Micro-machining in NTM is not possible.
15. Power consumption and machining cost in NTM is moderate.
16. In LBM process, the holes or cavities may be tapered and the depth of cut is limited.
17. Ultrasonic vibrations are transformed by means of a magneto-structive transducer into mechanical vibrations.
18. In EDM process, every spark generates not sufficient heat to melt and vaporise a very small volume of metal from the workpiece.
19. In laser rod, the beam of light is reflected and accelerated in the path.
20. Dielectric is generally mixture of sodium chloride in water.
21. Electrolyte fluids are generally kerosene, transformer oil, etc.
22. In LBM process, contouring a surface can generate very well.
23. In USM process, accuracy up to 0.005 mm is possible.
24. Power consumed in LBM process is about 2700 kW/cm³/min.

Choose the correct one from the alternatives given below against each question:

25. In LBM process, contouring a surface is (i) Poor (ii) Good (iii) Fair (iv) Bad.
26. Maximum metal removal rate in ECM process is (i) Medium (ii) Low (iii) High (iv) Extra high.
27. In EDM process, penetration rate in mm/min. is about (i) 0.5 (ii) 12 (iii) 100 (iv) 50

28. Accuracy in USM process in mm is about (i) 0.005 (ii) 0.01 (iii) 0.001 (iv) 0.05.
 29. In EDM process, power consumed in kW/cm³/min. is about (i) 9.00 (ii) 7.20 (iii) 1.80 (iv) 2700.
 30. Alternative name of the non-traditional machining processes is any of the following
 (i) New technology (ii) Modern machining methods (iii) Unconventional machining method (iv) All of the above (v) None of the above.
 31. Limitation(s) of using NTM is(are) any of the following (i) Very much costly machining (ii) High power consumption per unit volume per unit time (iii) In ECM and EDM method, work material must be conductive (iv) All of the above (v) None of the above.

Match the correct answer from group B against statement given in group A :

32. Match the different non-traditional machining processes w.r.t. their basic mechanism of metal removal

Group-A	Group-B
(a) USM	(i) Vaporization by thermo -electric method
(b) ECM	(ii) Ion-displacement by electrochemical method
(c) EDM	(iii) Erosion by mechanical abrasion
(d) LBM	(iv) When heated, melts and vaporizes instantly by thermoelectric method.

33. Match the different NTM processes w.r.t. their immediate energy source at the job-tool interface

Group-A	Group-B
(a) USM	(i) Amplified light
(b) ECM	(ii) High voltage
(c) EDM	(iii) High current
(d) LBM	(iv) Pneumatic or Hydraulic pressure.

34. Match the different NTM processes w.r.t. their medium for transferring energy

Group-A	Group-B
(a) USM	(i) Electrolyte
(b) ECM	(ii) Electrons
(c) EDM	(iii) Radiation
(d) LBM	(iv) High velocity particles.

15. Fill up the blanks:

1. _____ is a bonded fine-grained abrasive process in which very little material is removed from a cylinder bore in an I.C. Engine while abrasive tool is rotating and vertical linear feeding.
 2. _____ is suitable for obtaining a surface of the highest class of finish (about 0.05 micron).
 3. _____ is the precision grinding with loose, dust type abrasives to produce geometrically true surface (about 0.1 micron).

Match the correct answer from group B against statement given in group A:

4. Match the different types of micro-machining processes w.r.t. their accuracies in microns (1 micron = 0.001)

Group-A	Group-B
(a) Superfinishing	(i) 1 to 12
(b) Honing	(ii) 0.9 to 5
(c) Grinding	(hi) 0.12 to 1.2
(d) Precision turning	(iv) 0.08 to 0.25
(e) Lapping	(v) 0.01 to 0.25

5. Match the range of cutting speed w.r.t. different finishing methods

Group-A	Group-B
(a) Honing	(i) 10 to 40 m/min.
(b) Lapping	(ii) 70 to 100 m/min.
(c) Superfinishing	(hi) 100 to 250 m/min.

16. Fill up the blanks:

1. _____ is an attitude for learning and practicing the safe working habits.
 2. A good and safe operator is one who is _____ conscious always, using safe and accepted procedures.
 3. Working _____ is the first essential of an operator.
 4. An _____ is a mishap.
 5. To maintain safety, moving parts in the shop-floor must be properly _____.
 6. Operator should get first _____ immediately after any injury.

17. Fill up the blanks:

1. Set of _____ are punched on cards or magnetic tape as per requirements of a product manufacturing, this tape is known as _____, which controls the movement of _____ control Machine Tools.
 2. The Machine Tools are controlled by the software of the computer and can easily be edited or modified as per requirement is known as _____ control Machine Tools.
 3. _____ computer controls the different numerical control machine tools through stellite computers.
 4. _____ computer is incorporated with numerical control system to control machine tool functions from stored-in information.
 5. In on _____ editing program, any change or mistake in cutting condition, in dimension, etc., can easily be edited or modified by the partdata stored in computer.
 6. In sophisticated manufacturing CNC can be integrated with _____ numerical control system.
 7. In _____ loop system is provided with a feed-back device (known as transducer) which can compensate errors in position of the tool/work.

8. In _____ loop system is not provided with a feed-back device.
9. In _____ motion control system, the position of cutting tool changes from a particular fixed point to a point as per requirement in the shortest path and time.
10. In _____ control system, the table movement vary continuously with respect to the variation of electrical voltage.
11. _____ transducer is employed to convert the amount of movement of work table into convertible electrical voltage pulse, each pulse represents a basic length.
12. In _____ system, all the measurements are taken from a fixed zero point or reference point.
13. In _____ system, needs no predetermined dactum. All the measurements are measured from the previous point at which the tool was resting.
14. _____ control unit of an N.C. Machine Tool is to read, interpret and convert perceived input (part program) into appropriate movements and controls through signals for N.C. actuation system.

Answers of Objective Questions

1.1. Products	1.2. Machine	1.3. Tools	1.4. Machine Tools
1.5. Metal cutting		1.6. Metal forming	
1.7. Forming	1.8. Cutting	1.9. Standard/Versatile/General	
1.10. Group	1.11. Cutting	1.12. Orthogonal	1.13. Orthogonal
1.14. Tool-life	1.15. Tailor's	1.16. Machinability	
1.17. Cutting-fluid		1.18. Grinding	1.19. Rust
1.20. Chloride	1.21. Cutting/Compound/Mixed oil		
1.22. Tool geometry/Tool signature	1.23. Centre	1.24. Machine-shop	
1.25. Chip	1.26. Continuous	1.27. Non-homogeneous	
1.28. Braker	1.29. Crater & flank		1.30. Discontinuous
1.31. Continuous	1.32. Shaper/Planer/Slotter		1.33. Cobalt
1.34. Seven	1.35. F	1.36. T	1.37. T
1.38. T	1.39. T	1.40. F	1.41. F
1.42. T	1.43. T	1.44. T	1.45. F
1.46. T	1.47. F	1.48. T	1.49. F
1.50. T	1.51. T	1.52. F	1.53. F
1.54. T	1.55. T	1.56. T	1.57. F
1.58. T	1.59. T	1.60. T	1.61. F
1.62. T	1.63. F	1.64. T	1.65. F
1.66. F	1.67. T	1.68. T	1.69. T
1.70. F	1.71. F	1.72. T	1.73. F
1.74. T	1.75. (ii)	1.76. (ii)	
1.77. (iii)	1.78. (ii)	1.79. (iii)	1.80. (iii)
1.81. (ii)	1.82. (iii)	1.83. (ii)	1.84. (iii)
1.85. (iii)	1.86. (ii)	1.87. (iv)	1.88. (i)
1.89. (iii)	1.90. (i)	1.91. (iii)	1.92. (ii)
1.93. (i)	1.94. (ii)	1.95. (iv)	1.96. (iii)
1.97. (ii)	1.98. (i)	1.99. (iv)	1.100. (iv)
1.101. (v)	1.102. (iv)	1.103. (iii)	1.104. (iii)
1.105. (iv)	1.106. (iv)	1.107. (iv)	1.108. (iii)
1.109. (iii)	1.110. (iii)	1.111. (ii)	1.112. (iv)
1.113. (iii)	1.114. (ii)	1.115. (iv)	1.116. (vi)
1.117. (v)	1.118. (iii)	1.119. (iv)	1.120. ii-iv-iii-i
1.121. ii-iii-i-v-iv		1.122. ii-vi-iii-v-i-iv	
1.123. iv-i-ii-iii	1.124. iv-iii-i-ii	1.125. i-iv-ii-iii	1.126. ii-iii-i-iv
1.127. iii-v-iv-i-ii	1.128. ii-i-iv-iii	1.129. iv-ii-iii-i	1.130. i-iii-iv-ii
1.131. iii-ii-i-iv	1.132. iii-iv-ii-v-i	1.133. ii-i-iii	1.134. iii-i-ii
2.1. Turning	2.2. High	2.3. Automatic	2.4. Swing, Length
2.5. Carriage	2.6. Heavy	2.7. Apron	2.8. Parts
2.9. Accessories	2.10. Attachment	2.11. Frictionless	2.12. Air-operated
2.13. Rests	2.14. Mandrel	2.15. Turning	2.16. Chilled cast
2.17. Single	2.18. T	2.19. F	2.20. T
2.21. T	2.22. T	2.23. F	2.24. T
2.25. T	2.26. T	2.27. T	2.28. F
2.29. F	2.30. T	2.31. T	2.32. F
2.33. T	2.34. F	2.35. T	2.36. F
2.37. T	2.38. F	2.39. T	2.40. F
2.41. T	2.42. T	2.43. F	2.44. T
2.45. F	2.46. T	2.47. T	2.48. T
2.49. T	2.50. T	2.51. F	2.52. T
2.53. T	2.54. F	2.55. T	2.56. F
2.57. T	2.58. F	2.59. T	2.60. (iii)
2.61. (i)	2.62. (iv)	2.63. (vi)	2.64. (ii)
2.65. (iv)	2.66. (i)	2.67. (iii)	2.68. (iii)
2.69. (ii)	2.70. (iv)	2.71. ii-i-iv-iii-vi-v	
2.72. ii-iii-iv-i-v	2.73. iii-ii-i	2.74. iii-iv-v-vi-ii	2.75. v-ii-iv-i-iii
2.76. v-iii-iv-i-ii	2.77. iv-iii-ii-i	2.78. iii-iv-i-ii-v	2.79. v-iii-i-ii-iv
2.80. iii-ii-i-iv			
3.1. F	3.2. F	3.3. T	3.4. T
4.1. Boring	4.2. Nomenclature and Angles	4.3. Trepanning	
4.4. Honing	4.5. Feed per Revolution	4.6. Drift	

4.7. Sleeve	4.8. Socket	4.9. Floating	4.10. T
4.11. F	4.12. T	4.13. T	4.14. T
4.15. F	4.16. T	4.17. T	4.18. F
4.19. T	4.20. T	4.21. (iii)	4.22. (iii)
4.23. (iii)	4.24. (iii)	4.25. (iv)	4.26. (ii)
4.27. (iii)	4.28. (ii)	4.29. v-iv-ii-i-iii	4.30. iii-iv-ii-i
4.31. iv-iii-ii-i	4.32. ii-i-iv-iii		
5.1. Arbor	5.2. Milling	5.3. Spindle	5.4. T
5.5. T	5.6. F	5.7. (iv)	5.8. (iii)
5.9. (ii)	5.10. (iii)	5.11. (iv)	5.12. (iii)
5.13. (ii)	5.14. (iii)	5.15. (iv)	5.16. (iii)
5.17. (iv)	5.18. (ii)	5.19. (iv)	5.20. (iii)
5.21. (iii)	5.22. (ii)	5.23. (iv)	5.24. i-iv-iii-ii
5.25. ii-iii-i-iv.			
6.1. Shaping	6.2. 900 mm ³	6.3. F	6.4. T
6.5. T	6.6. F	6.7. T	6.8. T
6.9. T	6.10. F	6.11. T	6.12. F
6.13. F	6.14. (ii)	6.15. (iii)	6.16. (i)
6.17. (iii)	6.18. (i)	6.19. (ii)	6.20. iii-ii-i
6.21. ii-iii-i	6.22. iii-iv-v-i-ii	6.23. iv-v-iii-ii-i	6.24. ii-i-iii.
7.1. Slotter			
8.1. Planing	8.2. 3 m × 3 m × 18.25 m		
9.1. Grinding	9.2. Abrasive	9.3. Grade	9.4. Grit or grain
9.5. Structure	9.6. Bond	9.7. Vittrified	9.8. Rubber
9.9. Vittrified	9.10. Silicate	9.11. Rubber	9.12. Truing
9.13. Dressing	9.14. Diamond	9.15. T	9.16. F
9.17. F	9.18. T	9.19. T	9.20. F
9.21. F	9.22. T	9.23. T	9.24. F
9.25. F	9.26. T	9.27. (iii)	9.28. (v)
9.29. (iii)	9.30. (ii)	9.31. (iv)	9.32. (v)
9.33. (iii)	9.34. (iv)	9.35. (v)	9.36. (ii)
9.37. (iii)	9.38. iii-ii-i	9.39. iii-ii-iv-i.	
10.1. Broaching	10.2. Length of stroke and force		
10.3. Travel and Cutting speed	10.4. Obstruction and blind		
10.5. 0.001	10.6. Multi	10.7. High	10.8. Minimum
10.9. Maximum	10.10. No	10.11. High Speed Steel	
10.12. Coolant	10.13. (Any value between 0.02 to 0.12 mm and 2 to 10 m/min.)		
10.14. Any value between 12° to 15° and 1° to 4°			10.15. T
10.16. F	10.17. T	10.18. F	10.19. F
10.20. F	10.21. T	10.22. T	10.23. T
10.24. F	10.25. (iii)	10.26. (iv)	10.27. (i)
10.28. (iii)	10.29. (iv)	10.30. ii-iii-i.	
11.1. Versatile	11.2. Lathe	11.3. T	11.4. T
11.5. F	11.6. F	11.7. T	11.8. F
11.9. F	11.10. T	11.11. (iv)	11.12. (ii)
11.13. (v)	11.14. (iv)	11.15. (iv)	11.16. (ii)
11.17. (iii)	11.18. (iii)	11.19. (iii)	11.20. iii-ii-i
12.1. Forming	12.2. Die and Punch	12.3. Punch, Die	
12.4. Kinetic Energy		12.5. Power, Mechanical, Hydraulic	
12.6. Blanking	12.7. Piercing	12.8. Coining	12.9. Force, Ram
12.10. Clearance	12.11. Punch	12.12. Die	12.13. Less
12.14. More	12.15. T	12.16. F	12.17. T
12.18. F	12.19. T	12.20. F	12.21. (iv)
12.22. (iii)	12.23. (ii)	12.24. (i)	12.25. (iv)
12.26. (iii)	12.27. (i)	12.28. (i)	12.29. (iv)
12.30. ii-iv-i-iii.			
13.1. Locating	13.2. Jig	13.3. Fixture	13.4. Clamping
13.5. Diameter	13.6. F	13.7. F	13.8. T
13.9. T	13.10. F	13.11. T	13.12. T
13.13. T	13.14. (v)		
14.1. Modern or Unconventional	14.2. Ultrasonic	14.3. Boron Cart	
14.4. Low V and High I	14.5. High V and Low I		
14.6. LBM	14.7. 100000 K and 100000 kW/cm ³	14.8. Conductive	
14.9. Reducing, Increasing	14.10. T	14.11. T	
14.12. F	14.13. T	14.14. F	14.15. F
14.16. T	14.17. T	14.18. F	14.19. T
14.20. F	14.21. F	14.22. T	14.23. T
14.24. T	14.25. (iii)	14.26. (iv)	14.27. (ii)
14.28. (i)	14.29. (iii)	14.30. (iv)	14.31. (iv)
14.32. iii-ii-i-iv	14.33. iv-iii-ii-i	14.34. iv-i-ii-iii.	

15.1. Honring	15.2. Super-Finishing	15.3. Lapping
15.4. v-iii-ii-i-iv	15.5. ii-iii-i.	
16.1. Safety	16.2. Safety	16.3. Safety
16.5. Guarded	16.6. Aid.	16.4. Accident
17.1. Instruction, Software, Numerical		
17.2. Computer Numerical	17.3. Master	17.4. Mini
17.5. Line	17.6. Direct	17.7. Closed
17.9. Point-to-Point	17.10. Analog	17.8. Open
17.12. Absolute	17.13. Incremental	17.11. Digital
	17.14. Machine.	

State whether the following statements are true or false:

1. If the turning tool is held in such a way that its cutting edge is above the centre of rotation of work piece, the front rake angle of the tool will be decreased.
2. Addition of cobalt in high speed tool increases keenness and stability of the cutting edge.
3. As regards belt made of leather, the grain side of the belt is the driving side.
4. Capstan and turret lathes as special purpose Lathes.
5. In speed Lathe as the speed of the lathe is very high it can be suitably used for high feed and high depth of cut.
6. A parting tool is a purely end cutting tool.
7. A facing tool removes metal by side cutting edges and so no top rake is necessary for a facing tool.
8. The angle formed by the flank and a plane at right angle to the twist drill axis is known as rake angle of the drill.
9. In a draw type of shape, the cutting pressure acts towards the column which allows to take deep cut on the job.
10. The cutting and return speed of a crank type of shape is almost uniform throughout the length of the stroke.
11. For machining chilled cast iron surface by shaping tool comparatively high feed and lower depths of cut is preferable.
12. An oblique single point cutting tool will remove more metal in the same life than an orthogonal cutting tool, other factors being the same.
13. Larger and heavier chucking work is being machined in Capstan Lathe.
14. The end formed by the intersection of the flute surface and the body clearance of a twist drill is known as the face of the drill.
15. Vanadium in the cutting tool of H.S.S. improves hot hardness and makes the cutting tool more wear resistant.
16. Cutting and return speed of a planer are almost uniform throughout the stroke.
17. Odd threads are those in which the products of pitch of the lead screw in mm and the number of teeth of the worm gear of the thread chasing dial must be in exact multiple of pitch of the job to be cut.
18. While machining mild steel bar with HSS cutting tool the average cutting speed should be restricted to 50 metres/min.
19. Half centres are used in lathe operation for reducing wear and strain.
20. A parting tool is a purely end cutting tool.
21. Automatic screw machines, capstan lathe and turret lathe are turned as special purpose lathes.
22. In capstan and turret lathes, the external threads are usually cut by thread chasers.
23. When a number of single spindle drilling machine column are placed side by side on a common base and have a common work table, the machine is known as multi-spindle drilling machine.
24. When the taper on the tool shank of a drill is larger than the spindle, taper sleeves are used to hold the tools.
25. If the cutting edges of a turning tool is held below the centre of the work to be turned, the rake angle is reduced and clearance angle is increased.
26. In case of Capstan Lathe, the hexagonal turret is mounted on the saddle which slides directly on the bed.
27. In a centre lathe, half centres are generally used for turning operation.
28. Tungsten in the H.S.S. tool provides keenness of the cutting edge of the tool.
29. In a centre lathe the tumbler gear is used to change the direction of rotation of the main spindle.
30. In U.S.M. process the vibratory tool striking on the flow of abrasive slurry, causes thousands of microscopic abrasive grains to remove the work material by mechanical shear erosion.
31. In E.C.M. process the workpiece is connected to the negative supply and the tool or the cathode which is connected to the positive terminal is advanced towards the workpiece through electrolyte that completes the circuit.
32. The essential property of a dielectric fluid in E.D.M. process in that they must not breakdown electrically in the shortest possible time when the breakdown voltage has been reached.
33. In L.B.M. process, there is no direct contact between the tool and the workpiece.
34. Push type of broaching tool can be made longer than, the pull type of broaching tool as the push type of broaching tool is subjected to compression.
35. Soft, tough and ductile materials and heavy cuts require dense structure grinding wheel.
36. Progressive dies as faster operation than compound dies.
37. The process of removing metal by milling-cutter, which is rotated against the direction of the workpiece is known as down milling operation.
38. Concave milling cutters have teeth curved outwards on the circumferential surface to form the contour a semicircle.
39. Honing operation is more precision than lapping operation.

40. E.C.M process is based of Michael Faraday s Classical Laws of Electrolysis requiring basically the two elements, an electrolyte, a gap and a source of A.C. power of sufficient capacity.
41. E.D.M. is the process of metal removal based on the principle of erosion of metals by a constant electric spark discharge between the electrode tool and the work.
42. Laser is an electromagnetic radiation which produces monochromatic light in the form of an almost collimated beam.
43. A broach is a multiple edge cutting tool that has successively same cutting edges along the length of the tool.
44. Dressing is the process of changing the shape of the grinding wheel as it becomes worn from the original shape owing to breaking away of the abrasive and bond.
45. In the rack cutter generating system both internal and external teeth on a gear blank can be cut.
46. The tooth profile of involute gears changes with the number of teeth on the gear for the same module.
47. The convex milling cutters have teeth curved outwards on the circumferential surface to form the contour of a semicircle.
48. Centreless type of grinder is an intermittent process of cylindrical surface grinding.
49. In practice a set 9 cutters are used to cut all gears ranging teeth from 12 teeth to rack for the same module.
50. In a broaching operation both roughing, semi-finishing and finishing cuts are completed in one pass of the tool.
51. The hardness of grinding wheel is specified by Brinell hardness number.
52. The thickness of chip in down milling process is minimum when the tool begins its cut and it increases to the maximum when the cut terminates.
53. Any solid material which can be melted without decomposition can be cut with laser beam machining process.
54. In blanking operation of press work, the clearance is provided on the punch.
55. Aluminium oxide is best suited abrasive material for grinding wheel because it is very hard.
56. In grinding, curved, convex and concave surfaces, surface grinders are employed.
57. The essential requirements of a dielectric fluid used in E.D.M. process are that they must remain electrically non-conductive until the required breakdown voltage has reached.
58. Numerical control cannot be applied to all of the machine tools.
59. A high rate of production is secured on hobbing machine because the cutting action is continuous in one direction.
60. A broach is a multiple edge cutting tool that has successively same cutting edges along the length of the tool.
61. Silicon carbide grinding wheel is used for grinding materials of low tensile strength.
62. The thickness of the chip in up milling process minimum at the beginning of the cut and it reaches to maximum when the cut terminates.
63. Electric discharge machining is a process of metal removal based on the principle of erosion of metals by a constant electric spark discharged between the electrode tool (usually cathode) and the work (anode).
64. The spindle will rotate 12° by one complete turn of the index crank of universal dividing head.
65. Cycloidal gear cannot be produced by generating methods of producing gears.
66. A dense structure grinding wheel is required for hard and brittle materials and where finishing cuts are required.
67. Buffing operation is followed by polishing operation.
68. Internal gears cannot be cut by pinion cutter generating process.
69. All involute gear cutters have equal pressure angle.
70. The V-belt made of fabric and vulcanized rubber with cotton cord runs in 60° -V-groove turned in the rim of the pulley.
71. The minimum diameter of the pulleys for transmitting power should be at least 24-times the thickness of the belt used to rim on the pulley.
72. The crowning of pulleys, in most case should not exceed 30»mm on the diameter per meter of width and the width of the pulley should be one fourth greater than the width of the belt used.
73. Cobalt is added to the high speed steel to increase the hot hardness and wear resistance of the tool.
74. Stellite is the trade name of nonferrous cast alloy composed of principally of carbon mixed with other elements such as tungsten and cobalt to form carbides.
75. The speed lathe consists of a bed, a head stock a tail stock and a Tool post mounted on the carriage.
76. Capstan and turret lathes are special purpose lathes.
77. The guide ways of the lathe bed may be flat or V-ways having included angle of 90° .
78. Thrust bearings are provided to the lathe spindle for taking up the radial loading.
79. As the heat conductivity of Ceramics are low, Ceramics tools must be used with coolants.
80. The tool is set in slightly advanced position than the two jaws of a follower rest during the rotation of the job.
81. If the cutting edge of a turning tool is held in such a way that its cutting edge is above the centre of the work piece the rake angle will be increased where as the clearance angle will be decreased.
82. Reaming is more accurate process than boring.
83. In Indian Standard System, twist drills are designated by the series to which they belong, the diameter, the I.S. number and the material of the drill.
84. The drilling tool may be removed from the spindle of the drilling machine by pressing a lapered sleeve into the slotted hole of the spindle.
85. The taps used serially for cutting external threads are taper, bottom and plug.

86. In vertical boring machine the work is rotated on a vertical axis and the tool is fed longitudinally in a vertical plane.

Fill in blanks with suitable word/words.

87. The edge formed by the intersection of the surface left by the provision of secondary clearance and the flute of the reamer is known as _____ of the reamer.
88. The average cutting speed for machining cast iron work piece with H.S.S. tool is _____ m/min.
89. The side cutting edge angle _____ the tool life for the same depth of cut.
90. A shaft has to be cut with a taper of 1: 3. The tangent of the angle of swivelling the compound rest will be _____.
91. The trade name of a non-ferrous cast alloy composed of cobalt, chromium and tungsten is known as _____.
92. Conditions favour to the formation of _____ chips include low cutting speed, low rake angle, high feed & depth of cut.
93. In case of capstan lathe the hexagonal turret is mounted on _____ which slides on the saddle.
94. The sleeve with the tool may be removed from the spindle by forcing a _____ within the slot of the spindle.
95. Three surfaces can be machined at a time by _____ planer.
96. The central portion of the drill situated between the roots of the flutes and extended from the point towards the shank is called _____ of the drill.
97. The bed of a lathe machine is made massive with sufficient depth and width to absorb _____.
98. The tool head of a planing machine is mounted on the _____ by the saddle.
99. In _____ shaper the tool is set in the reversed direction to that of a standard shaper.
100. In case of capstan lathe the hexagonal turret is mounted on a _____.
101. The end thrust on the job along the axis of rotation of the job due to axial feeding action of tool on the job is being taken up by _____ in case of lathe machine.
102. Cutting forces or power at the cutting tool may be measured by _____.
103. To get large velocity ratio _____ gearing is used.
104. _____ is the operation of smoothing and squaring the surface around a hole for the seat for a nut or the head of a screw.
105. The operation is producing a large hole by removing metal along the circumference of a hollow cutting tool is known as _____.
106. The operation of enlarging the end of a hole cylindrically and co-axially to a certain depth is called _____ operation.
107. The holding device with adjustable jaws set radially to hold straight shank drills are known as _____.
108. A Lathe machine part which carries the saddle, cross-slide, compound rest, tool post and apron is known as _____.
109. For setting washer over a casting surface we generally do _____ operation.
110. No top rake angle is required in a _____ tool as it removes metal by its side cutting edges.
111. Larger and heavier chucking works are usually handled on a _____ Lathe.
112. The metal column that separates the drill from the flutes and runs the entire length between the flanks is known as _____ of the drill.
113. In lathe operation while machining cast iron with H.S.S. tool the average cutting speed should be restricted metres/min.
114. Orthogonal cutting is mainly confined to _____ turning tool.
115. When the table is stationary and the column carding the cross-rail reciprocates on massive horizontal rails mounted on both sides of the table, the planer is known as _____ planer.
116. When the cutting face of a grinding wheel has particles of metal being ground adhering to it and the pores of the opening of the wheel face having been filled up with metal, the wheel is said to be _____.
117. When the milling cutter is rotated about an axis perpendicular to the work surface, the operation is called _____ operation.
118. To locate a work having odd irregular profiles _____ locator is used.
119. To obtain less velocity ratio _____ gearing is used.
120. For cutting 34 teeth of involute gear cutter no. _____ is to be used.
121. The machining time to broach a hole of a MS job having length of the broach travel 1 metre and cutting speed of 2 m/min, is _____ minutes.
122. Recently a new development in U.S.M. has taken place in which the tool impregnated with _____ is used and no slurry is used.
123. _____ gearing is used when the power is to be transmitted to two shafts with their axis-non-intersecting and in different planes.
124. _____ gears can not be produced by generating method of gear cutting.
125. The operation of cutting a sheet metal through part of its length and then bending the cutting portion is known as _____ operation.
126. One complete turn of the crank of the universal dividing head will cause the spindle and work to rotate through _____ degree.
127. To cut involute teeth of 60 teeth spur gear of certain module on a gear blank cutter no. _____ in the sets of cutter is used.
128. _____ grinder is capable of grinding irregular, curved, convex and concave surfaces.
129. The _____ is the extension of machine spindle on which cutters are securely mounted and rotated.

130. _____ milling machine has the arrangement of knee swivelling in addition to movements of tables as in case of a universal milling machine.
131. As the principle of generating gears system is based upon _____ system, cycloidal gears cannot be produced by generating methods .
132. _____ is precision grinding process that is used to produce geometrically true surfaces, correct mirror surface imperfections, improve dimensional accuracy with loose dust type abrasives.
133. The tool in case of U.S.M. process is made of _____.
134. Laser is an electromagnetic _____.
135. The operation of machining several surfaces of a workpiece simultaneously by feeding the table against a number of cutters mounted on the arbor is known as _____.
136. The _____ is the operation of production of a flat surface which may be vertical, horizontal or at an angle in reference to the table surface.
137. When the particles of the metal to be ground adhere with the cutting face of grinding wheel during operation, the wheel is said to be _____.
138. For low tensile strength materials, the wheels made of _____ is recommended.
139. To locate a work having add, irregular profiles _____ locator is used.
140. In a die with both cutting and non-cutting operations are accomplished at one station of the press in every stroke of the ram.
141. The operation of forming the edges of a component into a roll by bending the sheet metal in order to strengthen the edges and to provide smoothness to its surface is known as _____ operation.
142. The most important part of the laser apparatus is the laser _____.
143. The process of removing metal by a milling cutter which is rotated in the same direction of the travel of the workpiece is known as _____.
144. For cutting gear teeth of involute profile of same module, the number of cutters required to cut any gear from a pinion of 12 teeth to a rack are _____.
145. The operation of production of flat vertical surfaces on both sides of a workpiece by using two side milling cutters mounted on the same arbor is known as _____.
146. The operation performed by a milling cutter to produce a flat machined surface perpendicular to the axis of rotation of the cutter is known as _____.
147. When two shafts, the axes of which intersect, are to be connected by gearing, the wheels are known as _____.
148. The process of changing shape of the grinding wheel as it becomes worn from the original shape is known as _____.
149. The relative spacing of abrasive grains in a grinding wheel is referred to as the _____ of the wheel.
150. The main function of the _____ is to discard the workpiece from the punch or the die after the end of the cutting.
151. Low cutting speed, low rake angle, high feed, lack of cutting fluid and large depth of cut tend to promote the formation of _____ chips.
152. The r.p.m. of a 60 teeth Worm Wheel being driven by a worm shaft whose lead is equal to 3 pitch and revolving at 300 r.p.m. is _____.
153. Conditions tending to promote the formation of _____ chips include low cutting speed, low rake angle, high feed lack of cutting fluid and large depth of cut.
154. While turning a M.S. bar with a single point H.S.S. Cutting tool, the following observations are made:
Depth of Cut - 1 mm
Feed - 1 mm/rev.
Cutting speed - 30 metre/min.
Time to Tool Failure - 30 minutes.
The Tool life as per volume of metal removed until tool fails _____ mm³/min.
155. A clutch is a form of connection for transmitting motion between a driving shaft and a driven shaft member on the _____ axis.
156. The saddle is mounted on the _____.
157. For general purpose work the included angle of the lathe centre is usually _____ degree.
158. _____ is needed to be fitted in the tail stock to face the end of a bar.
159. To grip various work pieces with different hole diameters within a limit _____ mandrel is used.
160. The spindle end of a milling machine has a taper 1:4. The tan of the setting of the compound rest is _____.
161. Tool signature consists of _____ elements.
162. The turret of a capstan lathe is mounted on a _____ which slides on the saddle.
163. Reaming operation can not correct the _____ of the hole made by drilling.
164. When a number of single spindle drilling machine columns are placed side by side on a common base and have a common work table. The machine is known as _____ drilling machine.
165. The angle included between the two lips projected upon a plane parallel to the drill axis and parallel to the two cutting lips is known as _____ angle of a twist drill.
166. The size of a horizontal boring machine is specified by the _____ of its _____ in mm.
167. The operation of producing a large hole by removing metal along the circumference of a hollow cutting tool is known as _____.

Answers

1. F	2. F	3. T	4. F
5. F	6. T	7. T	8. F
9. T	10. F	11. F	12. T
13. F	14. F	15. F	16. T
17. F	18. F	19. F	20. T
21. F	22. T	23. F	24. F
25. T	26. F	27. F	28. F
29. F	30. T	31. F	32. F
33. T	34. F	35. F	36. F
37. F	38. F	39. F	40. F
41. T	42. T	43. F	44. F
45. F	46. T	47. T	48. F
49. F	50. T	51. F	52. F
53. T	54. T	55. F	56. T
57. T	58. T	59. T	60. F
61. T	62. T	63. T	64. F
65. T	66. F	67. F	68. T
69. T	70. F	71. T	72. F
73. T	74. F	75. F	76. F
77. F	78. F	79. F	80. T
81. T	82. F	83. T	84. F
85. F	86. T	87. Heel	88. 18 to 20
89. Increases	90. $\tan^{-1} \frac{1}{3}$ or 0.1666 rad	91. stellite	
92. Discontinuous or Segmental	93. Ram or Short-Slide		
94. Drift	95. Double Housing	96. Web	
97. Shock and Vibration	98. Cross-rail	99. Draw type	
100. Sub-bed	101. Thrust Bearing/Roller Bearing		
102. Force Dynamometer	103. Worm and Worm wheel		
104. Spot-facing	105. Trepanning	106. Counter-boring	
107. Drill chuck	108. Carriage	109. Spot-facing	
110. Thread-cutting	111. Turret	112. Web	
113. 20	114. Parting-off/grooving	115. Pit	
116. loaded	117. Face-milling	118. Outside pin	
119. Compound	120. 4	121. 1/2	122. Diamond dust
123. Spiral	124. Cycloidal	125. Latching	126. 9
127. 2	128. Surface	129. Arbor	130. Omniversal
131. Involute	132. Truing	133. Low-carbon steel/stainless steel	
134. radiation	135. Gang Milling	136. End Milling	
137. Loaded	138. Silicon Carbide	139. Outside pin	
140. Combination	141. Curling	142. Crystal/Rod	
143. Down Milling	144. 8	145. Straddle Milling	
146. Face Milling	147. Bevel gearing		
148. Truing	149. Structure	150. Stripper	151. Dis-continuous
152. 15	153. Built-up-edge	154. 9×10^5	
155. same	156. carriage	157. 60	158. Half-centre
159. Expansion	160. $\frac{1}{8}$ or 0.125	161. 7	162. Sub-bed
163. Location	164. Gang	165. Point	166. Spindle, diameter
167. Trepanning.			

