

1. The bull gear wheel is driven \_\_\_\_\_
- (1) by a shaft (2) by a pinion  
(3) by sliding block (4) none of the above
2. The process of heat treatment to soften the material is called \_\_\_\_\_
- (1) Hardening (2) Tempering  
(3) Annealing (4) Brazing

Ans : 2

Ans : 2

3. The gear used for speed reduction purpose is called as \_\_\_\_\_
- (1) Bevel gear  
(2) Worm and worm wheel  
(3) Rack and pinion gear  
(4) Mitre gears

Ans : 2

4. Scribes are made of
- (1) mild steel (2) high carbon steel  
(3) brass (4) cast iron

Ans : 2

5. The helical angle determines the
- (1) cutting angle (2) chew angle  
(3) rake angle (4) lip angle

Ans : 3

An essential feature of a twist drill is the helix angle (spiral angle). It determines **the process of chip formation**

6. The point angle of drill depends on
- (1) the size of the drill (2) the type of the machine  
(3) the material to drill (4) the RPM of the drill

Ans : 3

7. The process of enlarging the end of a hole for accommodating the socket screw head is

- (1) Reaming                      (2) spot facing                      (3) counter boring                      (4) counter sinking

Ans:3

8. Files are classified according to its

- (1) Weight  
 (2) Colour  
 (3) Shape & Shape  
 (4) None of the above

Ans :

**File** – Files of different types are the principal hand tools used by a fitter. Files are often used to put the finishing touches on a machined work piece, either to remove burrs or sharp edges or as a final fitting operation. Intricate parts or shapes are often produced entirely by skilled workers using files. In this unit you are introduced to the types and uses of files in metalworking.

<https://www.educationalstuffs.in/fitting/>

9. Wooden hammers are called as

- (1) Claw hammer                      (2) Ball pane hammer  
 (3) Sledge hammer                      (4) Mallet

Ans : 4

10. The difference between high limit and low limit is called as

- (1) Fit                                      (2) Limit  
 (3) Tolerance                              (4) Allowance

Ans : 3

11. The tolerance given on one side of the basic size is known as

- (1) Bilateral tolerance  
 (2) Unilateral tolerance  
 (3) Both (A) & (B)

(4) None of the above

Ans : 2

12. Which of the mechanisms converts rotary motion to linear motion?

- (1) Worm and worm wheel mechanism
- (2) Bevel gear mechanism
- (3) Crank and slotted link mechanism
- (4) Bell crank lever mechanism

ANS : 3 (A SLIDER-CRANK MECHANISM IS A TYPICAL DESIGN WHICH CONVERTS ROTARY MOTION INTO LINEAR MOTION. IT IS ACHIEVED BY CONNECTING A SLIDER AND A CRANK WITH A ROD.) SHAPER QR MECHANISM

In a shaper, rotary motion of the drive is converted into reciprocating motion of the ram by the mechanism housed within the column or the machine. In a standard shaper metal is removed in the forward cutting stroke, while the return stroke goes idle and no metal is removed during this period. The shaper mechanism is so designed that it moves the ram holding the tool at a comparatively slower speed during forward cutting stroke, whereas during the return stroke it allow the ram to move at a faster speed to reduce the idle return time. This mechanism is known as quick return mechanism. The reciprocating movement of the ram and the quick return mechanism of the machine are generally obtained by anyone of the following methods:

- (1) Crank and slotted link mechanism
- (2) Whitworth quick return mechanism, and
- (3) Hydraulic shaper mechanism

<https://www.mechtechguru.com/2020/10/SHAPER%20MECHANISM%20Crank%20and%20slotted%20link%20mechanism.html>

13. Jig is a device

- (1) To hold the tool
- (2) To hold the job firmly and also guide the tool
- (3) To guide the tool
- (4) None of the above

Ans : 2

13.1 A fixture is a device

- (1) To hold the tool
- (2) To hold the job and also guide the tool
- (3) To guide the tool
- (4) To hold the job firmly

Ans : 4

14. In a grinding wheel, a bond is defined as

- (1) Natural abrasive
- (2) Artificial abrasive
- (3) Binding agent**
- (4) None of the above

Ans :3

#### Types of bonds

Abrasive grains are held together in a grinding wheel by a bonding material. The bonding material does not cut during grinding operation. Its main function is to hold the grains together with varying degrees of strength. Standard grinding wheel bonds are vitrified, resinoid, silicate, shellac, rubber and metal.

<https://www.americanmachinist.com/cutting-tools/media-gallery/21135367/chapter-16-grinding-wheels-and-operations-cutting-tool-applications>

15. Brass contains

- (1) Aluminium and Copper
- (2) Copper and Zinc**
- (3) Tin and Lead
- (4) Copper and Nickel

Ans : 2

16. The metal which contains iron is termed as

- (1) Non-ferrous metal
- (2) Ferrous metal**
- (3) Non-metal
- (4) None of the above

Ans : 2

17. The most brittle of the following metals is

- (1) Steel
- (2) Aluminium
- (3) Brass
- (4) Cast Iron**

Ans : 4

18. The angle of metric thread is

- (1) 29° (2) 47.5°  
 (3) 55° (4) 60°

Ans : 4

19. One inch is equal to

- (1) 25.4mm (2) 24.5mm  
 (3) 26.4mm (4) 20.5 mm

Ans : 1

20. A stud extractor is used to remove

- (1) Nut (2) Rivet  
 (3) Screw (4) Bolt

Ans :3

#### SCREW EXTRACTOR DESIGN

A screw extractor is a high-strength steel shaft with a square head on one end and reverse tapered cutting screw threads on the other end. The square head fits into a T-handle that's used to turn the extractor. You can also grip and turn the head of the tool with locking pliers.

#### HOW TO USE A SCREW EXTRACTOR DRILL A PILOT HOLE

To use a screw extractor to remove a screw, drill a pilot hole into the center of the damaged screw, using a power drill and a twist bit of appropriate size. Then drill a larger hole with the bit sized for the extractor. The pilot hole diameter varies according to the extractor size you are using. Follow the recommendations on the package that came with the extractor.

#### EXTRACT THE SCREW

Attach the extractor bit firmly to a T-handle or grip it with locking pliers. Place the extractor bit into the pilot hole in the damaged screw.

Using a hammer, tap the extractor firmly into the pilot hole. Apply downward pressure on the extractor while turning it counterclockwise to remove the damaged screw.

If the extractor slips and loses its bite in the screw, try tapping the extractor again to get a better seat in the pilot hole. Push down more firmly as you turn the extractor counterclockwise. If that doesn't work, enlarge the pilot hole just slightly and try

again.

<https://www.thespruce.com/remove-a-broken-screw-with-an-extractor-1824847>

21. For cutting thin tubing, the most suitable pitch of the hacksaw blade is

- (1) 1.8mm (2) 1.4mm  
 (3) 1.0mm (4) 0.8mm

Ans : 4

22. The cutting angle for chipping cast iron is

- (1) 60° (2) 55°  
 (3) 90° (4) 37.5°

Ans : 1

23. The Morse taper provided on drills ranges between:

- (1) MT<sub>1</sub> to MT<sub>5</sub> (2) MT<sub>1</sub> to MT<sub>4</sub>  
 (3) MT<sub>0</sub> to MT<sub>5</sub> (4) MT<sub>0</sub> to MT<sub>6</sub>

Ans :4

There are several sizes of them and a variety of types. Morse invented the twist drill during the civil war, and quickly learned of the need to be able to hold the drill true. A unique feature of the twist drill is that it is self-aligning. It really wants to drill true, but it needs to be set true. A taper fit is the natural way to join two pieces of steel and have them true to one another. The challenge is figure out the right amount of taper, and of course the male and female mating parts must be of the same taper. Morse defined a taper of approximately 5/8's of an inch to the lineal foot as a suitable taper because it will generally jam together, and 'stick' tightly enough to transmit the needed power for drilling.

Ultimately 8 sizes of Morse Tapers, viz., 0, 1, 2, 3, 4, 5, 6 and 7 were defined as national standards.

- MT#0 is 0.356
- MT#1 is 0.475
- MT#2 is 0.700
- MT#3 is 0.938
- MT#4 is 1.231
- MT#5 is 1.748
- MT#6 is 2.494
- MT#7 is 3.270

While the exact taper varies a little for each one, all adhere roughly to the 5/8's inch per foot taper specification. These are the measurements in inches of the 'big end' of the taper. If you are looking at the female end, this will be the diameter of the hole. Other tapers include Brown and Sharpe, Jacobs, Jarno.

<http://www.vannatabros.com/shop52.html>

24. The reamer is used for

- (1) Drilling holes in thin sheets
- (2) Drilling deep holes
- (3) Removing burs
- (4) Enlarging and finishing already drilled holes

Ans : 4

25. While normalizing, after heat treatment, the component should be cooled

- (1) By dipping in water
- (2) By forced air
- (3) By quenching in oil
- (4) In still air in room temperature (i.e., taken out from the furnace)

Ans : 4

26. While annealing, after heat treatment, the component should be cooled

- (1) By dipping in water
- (2) By forced air
- (3) By quenching in oil
- (4) Inside the furnace

Ans : 4

27. Generally the ratio of time taken for the forward and return strokes in a shaper is

- (1) 2:1
- (2) 1.:2
- (3) 3:2
- (4) 2:3

Ans : 3

28. The purpose of tempering of a hardened steel component is for:

- (1) Increasing its hardness
- (2) Reducing its hardness
- (3) Increasing its ductility
- (4) Increasing its toughness

Ans : 4 (The maximum hardness of a steel grade, which is obtained by hardening, gives the material a low toughness. Tempering reduces the hardness in the material and increases the toughness. Through tempering one can adapt materials properties (hardness/toughness ratio) to a specified application.)

#### TEMPERING

Tempering is a low temperature (below A1) heat treatment process normally performed after neutral hardening, double hardening, atmospheric carburising, carbonitriding or induction hardening in order to reach a desired hardness/toughness ratio.

#### BENEFITS

The maximum hardness of a steel grade, which is obtained by hardening, gives the material a low toughness. Tempering reduces the hardness in the material and increases the toughness. Through tempering you can adapt materials properties (hardness/toughness ratio) to a specified application.

#### PROCESS DETAILS

The tempering temperature may vary, depending on the requirements and the steel grade, from 160°C to 500°C or higher. Tempering is normally performed in furnaces which can be equipped with a protective gas option. Protective gas will prevent the surface from oxidation during the process and is mainly used for higher temperatures. For some types of steels the holding time at the tempering temperature is of great importance; an extended holding time will correspond to a higher temperature.

<https://www.bodycote.com/services/heat-treatment/hardening-and-tempering/tempering/>

29. The inside corner of a job should be finished by using

- |                     |                      |
|---------------------|----------------------|
| (1) round nose tool | (2) cornering tool   |
| (3) key way tool    | (4) square nose tool |

Ans :1

30. Plain turning is also called as

- (1) Conical turning
- (2) Step turning



(3) Cylindrical turning

(4) Ball turning

Ans : 3

31. The purpose of tumbler gear is to :

(1) Cut gears

(2) Reduce spindle speeds

(3) Give desired directions of movement to the carriage

(4) Reverse the spindle direction

Ans :3. (Tumbler gear mechanism is used **to change the direction of lead screw and feed rod in lathe machines**. By Engaging tumbler gear, the carriage can be moved automatically from tailstock end to headstock.)

32. Centre gauge is used to ;

(1) Check the pitch of the thread

(2) Set the tool at the correct centre height

(3) Check the fit of the thread

(4) Check the angle of threading angle

Ans :4

**Center gauges** and **fishtail gauges** are gauges used in lathe work for checking the angles when grinding the profiles of single-point screw-cutting tool bits and centers. In the image, the gauge on the left is called a **fishtail gauge** or **center gauge**, and the one on the right is another style of **center gauge**.

These gauges are most commonly used when hand-grinding threading tool bits on a bench grinder, although they may be used with tool and cutter grinders. When the tool bit has been ground to the correct angle, they are then used to set the tool perpendicular to the workpiece.

They can incorporate a range of sizes and types on the one gauge, the two most common being metric or UNC and UNF at 60°, and BSW at 55°. Gauges also exist for the Acme thread form.

[https://en.wikipedia.org/wiki/Center\\_gauge](https://en.wikipedia.org/wiki/Center_gauge)



33. What is the correct dimension, when the micrometer measures 45.54mm, if it has a negative error of 0.02mm ?

- (1) 45.56mm (2) 45.53mm  
 (3) 45.54mm (4) 45.58mm

Ans : 1

34. What is the correct dimension, when the micrometer measures 45.54mm, if it has a positive error of 0.02mm ?

- (1) 45.52mm (2) 45.53mm  
 (3) 45.54mm (4) 45.58mm

Ans : 1

35. The operation of sharpening a grinding wheel is called

- (1) truing (2) aligning  
 (3) dressing (4) balancing

Ans : 3

35.1 The operation of profiling a grinding wheel is called

- (1) truing (2) aligning  
 (3) dressing (4) balancing

Ans : 1

36. Which one is not the cause for glazing of grinding wheel?

- (1) Hard wheel in place of soft wheel  
 (2) Higher wheel speed than recommended

- (3) Dirty coolant
- (4) Improper dressing

Ans : 2 (glazing – dullness of cutting edges of grinding wheel)

37. Which one is not a cause for loading of grinding wheel?

- (1) More depth of cut
- (2) High work speed than recommended
- (3) Feed too fine
- (4) Dense structure

Ans :1

Box: Grinding problems

In grinding process, this phenomenon is called “(wheel) loading”, which can be defined as the state of a grinding wheel when particles of a work-piece material either adhere to the grits or become embedded in the spaces between abrasive grains on grinding wheels. This phenomenon deteriorates grinding-wheels, and consequently the surface integrity of ground materials, such as surface roughness of the ground materials due to excessive friction and heat.

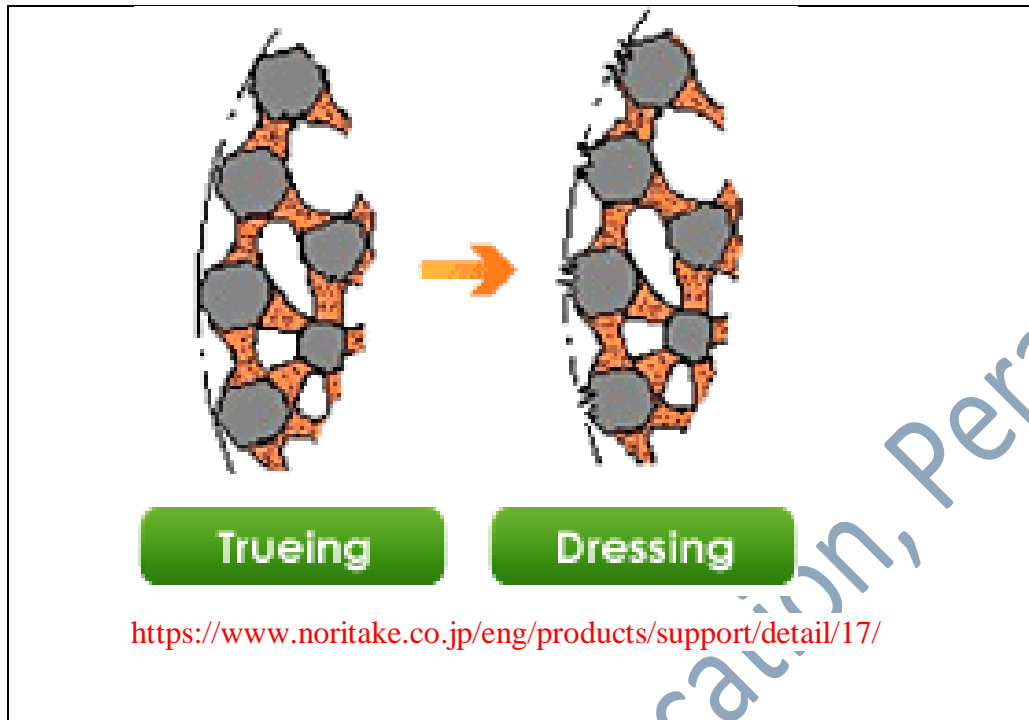
<https://www.azom.com/article.aspx?ArticleID=5570>

A glazed grinding wheel is the result of high attritious wear causing the grains to become dull. A loaded grinding wheel is a result of **chips clogging the grains on the grinding wheel** due to the grinding of soft materials, improper grinding wheel selection processing parameters.

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**Dressing** . When the sharpness of grinding wheel becomes dull because of glazing and loading, dulled grains and chips are removed (crushed or fallen) with a proper dressing tool to make sharp cutting edges and simultaneously, make recesses for chips by properly extruding to grain cutting edges. Thus, these operations are for the dressing.

**Trueing**. When the grinding wheel is mounted to the grinding wheel spindle, the run-out on wheel operating surface is removed, the wheel during contour grinding is trued or worn grinding wheel is corrected. Thus, these operations are for the trueing.



## Box2: Grinding problems

### 5 MOST COMMON GRINDING PROBLEMS AND HOW TO FIX THEM

**Most Common Grinding Process Related Problem – Chatter**  
The most frequent problems during grinding include

- Grinding Chatter
- Wheel Loading
- Wheel Glazing
- Burning of Work
- Searching of Work: Indication

#### GRINDING CHATTER

Causes & Method of Correction – Grinding Chatter

Wheel grading too hard-Use softer grade or coarser grit.

Wheel out of balance-Rebalance after truing operation. Run wheel without coolant to throw off excess water. When wheel is removed from machine store on side to prevent water from setting at lower edge of wheel.

Wheel out of round- True before and after balancing.

Work centers of work rests not true, or improperly lubricated Check fit of centers and rests Provide constant and even lubrication.

**WHEEL LOADING – METAL LODGED ON GRAINS OR IN WHEEL PORES**

Causes & Method of Correction

Incorrect wheel-Use coarser grain size, or more open bond to provide chip clearance.

Faulty dressing-Use sharper dresser Dress faster

Coolant-Use more, cleaner and thinner coolant.

WHEEL GLAZING

Causes & Method of Correction

Wheel grading hard and finer grit- Use coarser grain size, softer grade.

Improper dressing- Keep wheel sharp with sharper dresser. Use faster dressing tool traverse. Use more dressing tool penetration.

BURNING OF WORK

Causes & Method of Correction

Wheel grading too hard-Use softer grade. Prevent glazing and loading. Use more coolant.

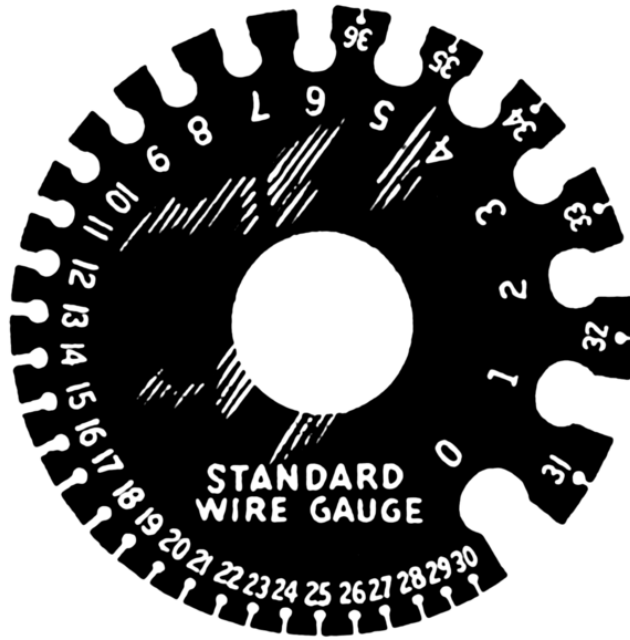
Faulty operation-Bring wheel to work more gradually, use less in-feed. Prevent stoppage of work while in contact with wheel.

<https://www.hindustanabrasives.com/blog/grinding-problems/>

38. Thickness of sheet are measured with

- (1) Plug gauge
- (2) Ring gauge
- (3) Wire gauge
- (4) Snap gauge

Ans : 3



[https://commons.wikimedia.org/wiki/File:Wire\\_gauge\\_\(PSF\).png](https://commons.wikimedia.org/wiki/File:Wire_gauge_(PSF).png)  
 (Pearson Scott Foresman - Archives of Pearson Scott Foresman,  
 donated to the Wikimedia Foundation )

#### A GUIDE TO WIRE GAUGE SIZES

Wires come in different thicknesses—i.e., gauges—each of which is suited to different purposes.

American Wire Gauge (AWG) is a standard method of measuring and identifying cable thickness developed in the United States for electrically conductive wire. It is suitable for specifying gauges for round and solid conductive wires made from non-ferrous material. As a wire's thickness affects its electrical properties (e.g., resistance and load-carrying capacity), knowing the gauge of a wire allows industry professionals to quickly and easily determine whether it is appropriate for a specific application. This knowledge can also be communicated between different parties, such as from the manufacturer to the consumer.

#### WIRE GAUGE SIZE CHART

American Wire Gauge standards range from 0000 (which can handle up to 302 amps) to 40 (which can handle up to 0.0137 amps). Most household and commercial wiring demands range from 2 (95 amp maximum) or 3 (85 amp maximum) to 14 (15 amp maximum). In the table below, we outline all of the AWG cable sizes and their unique properties.

<https://precmfgco.com/wire-gauge-sizes-guide/>

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In the field of metrology, wire gauges are used to measure the diameters or

cross-sectional area of round, solid, nonferrous, electrically conducting wires. By utilizing the diameter or cross-sectional area of the wire, wire gauges assist users in knowing the current-carrying capacity of electrically conducting wires.

### Wire Gauge Standards: AWG vs SWG vs IEC

Wire gauge sizes are represented through numerical values, AWG 4/0 through AWG 40. **The lower the number assigned to a wire the larger its diameter; the higher the number the smaller its diameter.** AWG stands for American Wire Gauge. AWG is the numerical standard that established wire gauge sizes for measuring wire gauges in the United States. The AWG is not universal. The British Imperial Standard Wire Gauge, the SWG, is the standard of measurement used in the UK. More popular is the IEC 60228, the International Electrotechnical Commission's international standard on conductors of insulated cables. IEC 60228 is the metric wire-size standard used throughout most parts of the world. Thus, because of the three different standards, how wire gauges are measured and what standard sizes of wire are the most obvious differences among the standard of measurements used throughout the world. AWG standard for measuring wire is defined by the imperial system of measurement, the system that measures in inches. SWG and IEC measurements utilize metric systems.

<https://blog.jemelectronics.com/how-wire-gauge-sizes-work>

39. To remove dents on vehicle body one can use

- (1) flatters (2) hammer  
(3) mallet (4) stakes

Ans : 3

40. Cast iron is normally turned by applying

- (1) Soluble oil as coolant (2) no cutting fluid  
(3) Straight cutting oil as a coolant (4) water as coolant.

Ans: 2 (dry cutting; cutting fluid will clog since the chips formed are discontinuous not like continuous chips formed during MS or other ductile materials)

41. Broaching is the process in which

- (1) A cutting tool is pushed or pulled through a hole or surface of a work piece  
(2) The work piece is pushed or pulled through the tool  
(3) Both the work piece and tool are rotated through a hole or surface

(4) Only the tool is rotated through a hole or surface

Ans: 1

42. When threading the carriage is moved along the bed-ways by

- (1) A pinion and rack (2) the feed-rod spline or key-way  
(3) The lead screw thread (4) the hand wheel.

Ans: 3

43. The process of beveling the end of a hole is called

- (1) Counter boring (2) counter sinking  
(3) Spot facing (4) reaming

Ans: 2

44. The process of enlarging a hole at the top for certain depth is called

- (1) Counter boring (2) counter sinking  
(3) Spot facing (4) reaming

Ans: 1

45. The process of facing the top is called

- (1) Counter boring (2) counter sinking  
(3) Spot facing (4) reaming

Ans: 3. (A spotface or spot face is a machined feature in which a certain region of the workpiece is faced, providing a smooth, flat, accurately located surface.)

46. Solder is a special mixture of

- (1) Copper and lead (2) tin and lead  
(3) Copper and tin (4) zinc and tin

Ans: 2

47. The standard pipe fittings are provided with threads conforming with

- (1) BA (2) BSW (3) BSP (4) Metric

Ans: 3

48. The necessity of tack welding in a joint is to



(1) Join two pieces of plates

(2) join two pieces of pipes

(3) Control distortion during welding

(4) eliminate spatters

Ans:3

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