Question Bank – Metal Trades Technology

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metal trades
T.T.P Series No. 44

DEVELOPMENT CELL
FOR SKILLED LABOUR TRAINING
DIRECTORATE OF MANPOWER & TRAINING
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LAHORE

This Question Bank with its sections

MATERIALS, BENCH WORK, MACHINE TOOLS GENERAL, MACHINE ELEMENTS, BRAZING and WELDING, HEAT TREATMENT, THREADS, TURNING, MILLING, SHAPING and PLANING, DRILLING and REAMING, GRINDING, MEASURING and CHECKING

covers all main aspects of technology relevant for trainees in the metal trades.

It provides a multitude of questions to the Trade Testing Authorities and to teachers and instructors in Training Centres and undertakings and thus to a great extent relieves them of the time consuming work of again and again finding and compiling new questions for intermediate and final tests.

Throughout this Question Bank multiple–choice questions have been used, as only this type of questioning allows for a high degree of objectivity and for a time saving method of checking. Of great importance for the assessment is the fact that only one of the given answers is correct.

For teachers and instructors a main advantage of this Question Bank is that not only can tests be set up in a very short time but that they can also be carried out within minutes (e.g. an intermediate test with 15 different questions on a special topic can be conducted within 20–30 minutes).

Thus it is much easier for the teacher to permanently maintain a clear picture of the knowledge of his students. The student himself is able to check his knowledge regularly and the whole series of questions may help him in preparing for the final test as well.

DO NOT WRITE ON THE QUESTION SHEETS!
ALWAYS USE A SEPARATE MARKING SHEET!

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MATERIALS

Mat 1.1

Cast–iron can be identified at the grinding wheel by its producing

A. dark red interrupted sparks.
B. a large number of yellow whitish sparks, branching and lighting.

C. long continuous light red sparks.
D. a few continuous yellow sparks.

Mat 1.2

When converting pig−iron into steel

A. the blast furnace is used.
B. the content of carbon, sulfur and phosphorus must be increased.
C. the pig−iron is rolled into bars, pipes and sheets.
D. the LD−process (oxygen converter process) is applied for mass production.

Mat 1.3

Iron carbide is

A. a mixture of iron and graphite.
B. a chemical compound of 3 atoms of iron and 1 atom of carbon.
C. a molecule forming crystal in white pig−iron.
D. the main element in iron−ore.

Mat 1.4

The best protective coating of steel is achieved if it is covered with

A. a layer of plain copper.
B. a layer of copper followed by a layer of zinc.
C. subsequent layers of copper, nickel and chromium.
D. a layer of nickel which is polished and coated with lacquer.

Mat 1.5

The application of oxygen in LD−converters (oxygen converters)

A. results in higher shares of scrap for steel−making.
B. makes a better fuel usage possible for the flame.
C. reduces the wear of the air nozzle at the bottom of the converter.
D. gives a longer processing time and allows an accurate analysis of the melt.

Mat 2.1

Unalloyed steel with a carbon content of 0.8 – 1.4 % C is suitable for

A. welding constructions on bridges and ships.
B. bars, ropes and wires in general engineering constructions.
C. producing saw blades, scraper and files.
D. gears, chains, spanners and levers.

Mat 2.2

What is asbestos?

A. A mineral
B. A thermosetting plastic
C. A material made of fibre glass and cement
D. A thermoplastic
E. A material made of graphite and lead

Mat 2.3

Which of the following are the components of brass?

A. Copper and tin
B. Copper and iron
C. Magnesium and lead
D. Copper and zinc
E. Copper, nickel and zinc

Mat 2.4

A steel with the denomination St 33 is

A. a heat treatable steel.
B. an unalloyed tool steel.
C. an automatic steel.
D. a mild steel.
E. a special spring steel.

Mat 2.5

A steel is called “high alloyed steel” if

A. it contains at least 2 % chromium and 1 % nickel.
B. it contains more than 5 % alloying elements
C. it contains more than 1.7 % alloying elements
D. it contains at least 0.9 % carbon and 2 % chromium.
E. at least a hardness of 60 HRC can be achieved.

Mat 2.6

Up to which temperature do cutting tools of cemented carbides preserve their cutting ability?

A. 500 °C
B. 900 °C
C. 721 °C
D. 1500 °C
E. 2130 °C

Mat 3.1

Which statement about aluminium is incorrect?

A. For the mechanical engineer the low weight and the resistance to corrosion are important.
B. The building constructor finds important its wear resistance and brittleness.
C. For the electrical engineer the electrical conductivity and resistance to corrosion are of much interest.
D. The housewife likes the good heat conductivity and low weight of aluminium.

Mat 3.2

Brass can be identified in a group of workpieces made of brass, copper, mild steel and aluminium by its

A. light weight.
B. dark red appearance.
C. high ductility.
D. forming short chips when cut on a machine tool.

Mat 3.3

Which statement is incorrect?

A. The electric furnace is used for refining steel.
B. White pig iron is used for the production of steel.
C. In the cupola furnace pig iron is converted into cast iron.
D. Siemens–Martin steel is produced with pure oxygen only.

Mat 3.4

Whether a drill is made of high carbon steel or high speed steel, can be checked by using

A. a file for filing test.
B. the spark test on a grinding wheel.
C. the vernier caliper to measure the hole.
D. the highest possible cutting speed until the drill gets blue and dull.

Mat 3.5

Corrosion causes

A. the formation of alloys on the surfaces of metal−pieces.
B. wear of guideways.
C. a chemical compound of at least two metals reacting with air.
D. destruction of metallic surfaces by means of chemical or electro−chemical reactions.

Mat 4.1

Which statement about brass is correct?

A. It gets more brittle with decreasing copper content.
B. It is an alloy of copper and tin.
C. Brass is more ductile than copper.
D. Brass castings are very ductile but show no good resistance to corrosion.

Mat 4.2

In contrast to the Thomas Converter, in the LD−converter

A. an air−oxygen mixture is used.
B. oxygen supply is carried out through a pipe inside the converter.
C. the temperature is relatively low.
D. scrap cannot be utilized.

Mat 4.3

Steel workplaces can be protected against corrosion by

A. keeping other metals away from them.
B. keeping bright surfaces free from rainwater and saltwater.
C. covering the surface with a layer of lacquer, plastic or metals.
D. greasing, when workpieces must stand atmospheric influence for a long time.

Mat 4.4

The hardness of a metal cannot be checked by

A. penetration of a file or saw blade.
B. its sound when knocked.
C. means of centre punch.
D. the bending test.

Mat 4.5

The connection of copper and aluminium sheets on the body of a lorry will cause

A. permanent chemical corrosion of copper and aluminium.
B. electro−chemical corrosion as soon as dirty water reaches the connection.
C. the destruction of copper.
D. reactions between dirty water and aluminium.

Mat 5.1

Which statement about aluminium is incorrect?

A. Aluminium is used for the construction of aeroplanes because of its low density.
B. Aluminium is used for ship containers because of its resistance to corrosion.
C. Aluminium is used for electric wiring because of its electric conductivity.
D. Aluminium is used in the production of cooking pots because of its melting temperature.

Mat 5.2

Which statement is incorrect?

A. Lead is very heavy and resistant to acids.
B. Zinc is used for water–containers and complicated press–castings.
C. Aluminium is an ideal metal for construction of aeroplanes.
D. Copper is used for castings and for steel–alloys mainly.

Mat 5.3

Which material has the designation “St 33”?

A. Malleable cast iron with 3.3 % carbon.
B. Malleable cast iron with a minimum tensile strength of 330 N/mm^2.
C. Steel with a minimum tensile strength of 330 N/mm^2
D. Steel, for which a minimum tensile strength is not guaranteed (but lies between 330 to 550 N/mm^2).
E. Mild steel with a carbon content of 0.33 %.

Mat 5.4

What disadvantage have ceramic cutting materials as compared with cemented carbides?

A. A shorter service life
B. More expensive
C. Higher sensitivity to shock
D. Not suitable for heat treatable steels
E. Not suitable for cutting synthetic materials and non–ferrous metals

Mat 6.1

Which of the following materials is the basic material in aluminium production?

A. Silica sand
B. Bauxite
C. Cryolite
D. Manganese ore
E. Eternit

Mat 6.2

The hardenability of steel is mainly dependent on the

A. amount of oxygen.
B. amount of sulfur.
C. amount of silicone.
D. amount of carbon.
E. amounts of alloys.

Mat 6.3

Which of the following materials is the best conductor of heat?

A. Porcelain
B. Iron
C. Glass
D. Plastic
E. Copper

Mat 6.4

Materials breaking under stress without stretching considerably are:

A. brittle
B. hard
C. strong
D. heavy

Mat 6.5

The most popular workshop method for testing materials is the spark test. For which of the following materials can this method not be used?

A. High speed steel
B. Highly alloyed tool steel
C. Heat treatable steel
D. Aluminium
E. Stainless steel

Mat 6.6

Main alloying element of high speed steel is

A. sulphur
B. nickel
C. vanadium
D. tungsten
E. silicone

Mat 7.1

Hardness is the ability of a material to

A. return to the original shape after being bent.
B. resist penetration.
C. stand deformation (bending) without breakage.
D. stretch before breakage.

Mat 7.2

Zinc is used for

A. electric wiring in heavy machines and transformers.
B. plates of batteries.
C. pottery.
D. coating on steel sheets.

Mat 7.3

Manganese is an alloying element which makes steel

A. more wear resistant.
B. molten at a higher temperature.
C. ductile and useless for forging or bending.
D. invariable in length (no extension) while heated up.

Mat 7.4

Grey pig−iron is

A. the basic material for steel castings.
B. sent to the rolling mill.
C. brittle because of its high graphite content.
D. manganous and contains a considerable amount of iron−carbides.

Mat 7.5

Copper can be alloyed with

A. aluminium for making brass.
B. tin for making brass.
C. aluminium resulting in strong and hard aluminium alloys.
D. zinc so that solder is produced for zinc castings.

Mat 7.6

Cooking pots are made of aluminium mainly because of its

A. low density.
B. resistance to corrosion.
C. heat conductivity.
D. melting temperature.

Mat 8.1

The main advantage of plain carbon steel as compared with alloy steel is

A. its better edge holding properties and resistance to corrosion.
B. its hardness combined with ductility.
C. its lower costs and simpler production.
D. the possibility to get any properties desired.

Mat 8.2

Increasing carbon content in steel

A. results in better resistance to corrosion.
B. improves the ductility of steel (forging, bending).
C. reduces the possibility of hardening.
D. reduces the melting temperature.

Mat 8.3

How high is the amount of carbon of hardenable steel?

A. 0.05 – 0.5 % C
B. 0.1 – 0.2 % C
C. 0.2 – 0.6 % C
D. 0.6 – 1.7 % C
E. 1.7 – 3.5 % C

Mat 8.4

Which are the components of cemented carbides?

A. Metal carbides (e.g. WC, TiC) with mostly cobalt as a binding agent.
B. Iron carbide and tungsten as binding agent.
C. Silicon dioxide and titanium as binding agent.

D. Aluminium oxide and iron carbide as binding agent.
E. Calcium carbonate and cobalt carbide as binding agent.

Mat 8.5

Which are the main components of ceramic cutting materials?

A. Tungsten oxide
B. Aluminium oxide
C. Tungsten carbide and porcelain powder
D. Cobalt carbide and magnesium oxide
E. Carbon and aluminium oxide

Mat 9.1

Which of the following processes allows for the production of very pure copper (99.8 %)?

A. Roasting
B. Sintering
C. Blast processing
D. Electrolysis
E. Tempering

Mat 9.2

The special property of steel with a high amount of chromium is

A. good ductility.
B. good casting properties.
C. good machinability.
D. good welding properties.
E. high resistance against corrosion.

Mat 9.3

What is the influence of carbon on the malleability of steel?

A. The higher the contents of carbon, the lower the malleability.
B. No influence.
C. The higher the content of carbon the greater the malleability.
D. The lower the contents of carbon, the higher the malleability.

Mat 9.4

A copper sheet is heated up to 600 °C and subsequently quenched. What is the result of the quenching?

A. The copper sheet becomes soft.
B. The copper sheet is hardened.
C. The layer of roll scales cracks off.
D. The electrical conductivity is increased.
E. At the surface an anti–corrosion layer is formed.

Mat 9.5

Which of the following metals has the highest melting point?

A. Copper
B. Grey cast iron
C. Steel
D. Tin
E. Tungsten

Mat 10.1

The hardness of a diamond is 100 HRC.
Which is the greatest possible hardness that can be achieved for tool steels?

A. 45 HRC
B. 50 HRC
C. 67 HRC
D. 73 HRC
E. 82 HRC

Mat 10.2

Which statement concerning the thermal conductivity of synthetic materials as compared with metals is correct?

A. The thermal conductivity of synthetics is approximately twice as high.
B. The thermal conductivity of synthetics is approximately 100 times higher.
C. The thermal conductivity of synthetics is equal to that of metals.
D. The thermal conductivity of synthetics is considerably lower.
E. The thermal conductivity of synthetics is half that of metals.

Mat 10.3

Rust is a chemical compound of

A. Iron and nitrogen.
B. Iron, carbon and nitrogen.
C. Iron, oxygen and nitrogen.
D. Iron and oxygen.
E. Iron and sulphur.

Mat 10.4

Which alloying elements are added to steel to achieve a high resistance against corrosion?

A. Vanadium and tungsten.
B. Chromium and nickel.
C. Molybdenum and titanium.
D. Tungsten and titanium.
E. Vanadium and molybdenum.

Mat 10.5

Iron−ore is

A. iron mixed with slag.
B. a chemical compound of iron and carbon.
C. a chemical compound of iron, sulphur and phosphorous.
D. iron−oxide in various compositions.

Mat 11.1

Which statement is correct?

A. Steel is used for ropes because of its resistance to corrosion.
B. Tungsten is used for wires inside the bulbs because of its ductility.
C. Springs are made of steel because of its brittleness.
D. Copper is used for electric wiring because of its conductivity.

Mat 11.2

Which of the following elements particularly influences the malleability of steel?

A. Carbon
B. Manganese
C. Silicone
D. Hydrogen
E. Phosphorous

Mat 11.3

Which statement is incorrect?

A. Stainless steel is used for medical instruments, car parts, sinks.
B. High speed steel is used in the production of cutting tools.
C. Cast–iron can easily be melted but is brittle.
D. Cast–iron is used for levers under shocking stress.

Mat 11.4

The density of steel is

A. 7.2 kg/dm^3.
B. 7.85 kg/dm^3.
C. 8.3 kg/dm^3.
D. 8.8 kg/dm^3.
E. 8.9 kg/dm^3.

Mat 11.5

Steel with the denomination “St 50” is used for a special purpose.

What does the number in this standard symbol indicate?

A. Hardening stress in N/mm^2.
B. Carbon content in percentage.
C. One tenth of the tensile strength in N/cm^2.
D. Minimum tensile strength in N/mm^2.
E. Bending strength in N/mm^2.

Mat 12.1

Which statement is incorrect?

A. Stainless steel contains at least 12 % of chromium.
B. High speed steel is an alloy with at least 8 % tungsten.
C. Nickel increases the hardness of steel.
D. Carbon decreases the melting temperature of steel.

Mat 12.2

High speed steel retains excellent hardness at high temperatures because of its

A. chromium and nickel content.
B. manganese and nickel content.
C. sulfur and tungsten content.
D. tungsten and chromium content.

Mat 12.3

Cast iron is used for

A. high quality gears
B. beds, heavy steadies and pillars.
C. general construction work.
D. anvils, used in forging.

Mat 12.4

Which of the elements given below is mostly used as binding agent for cemented carbides?

A. Cobalt
B. Tungsten
C. Titanium
D. Carbon
E. Phosphorous

Mat 12.5

In which method of hardness testing a diamond pyramid is pressed into the surface of the workpiece to be tested?

A. Vickers–hardness test
B. Rockwell B–test
C. Rockwell C–test
D. Brinell–test

Mat 12.6

Hammers and files are <u>not</u> made of high alloy steel, because

A. they need not be so hard.
B. they are not used at high temperatures.
C. their wear through usage is comparatively low.
D. they need not be hardened.

BENCH WORK

BM 1.1

What happens if a soft material (pure aluminium) is cut with a hacksaw for steel?

A. The spaces between the teeth will be blocked, the saw will stuck up.
B. The teeth penetrate too deep into the material and break.
C. The surface is damaged when the sawing operation is started.
D. The teeth merely slide over the material and get blunt.

BM 1.2

What is the correct name for this tool?

A. Cone scraper
B. Spoon scraper
C. Triangular scraper
D. Burring scraper
E. Straight scraper

BM 1.3

Which are the names of the three main parts of a hand file?

A. Cut of file, file tip, edge of file.
B. File handle, file tooth, file tip.
C. File tang, file wedge, file handle.
D. File tang, cut of file, file wedge.
E. File blade, file tang, file handle.

BM 1.4

For which of the following materials is a rasp mostly used?

A. Copper
B. Wood
C. Lead
D. Aluminium
E. Ceramics

BM 1.5

What is the correct name for this tool?

A. Grooving chisel
B. Crosscut chisel
C. Punch
D. Flat cold chisel
E. Round nose chisel

BM 2.1

A sawing operation has to be carried out. Which criteria are of importance for the choice of the saw blade (as far as the number of teeth is concerned)?

A. The required surface quality of the workpiece.
B. The lubricants available.
C. The required depth of the cut.
D. The material to be cut and the length of the cut.
E. The cutting direction.

BM 2.2

What is the correct name for this tool?

A. Straight scraper
B. Machine scraper
C. Flat scraper
D. Hand scraper
E. Universal scraper

BM 2.3

Which of the following is a correct statement about milled files?

A. The top rake angle of the teeth is positive.
B. The teeth of cut files act like scrapers.

C. Cut files are only used for light metals.
D. The top rake angle is always negative.
E. Cut files can only be used for roughing operations.

BM 2.4

For which of the following materials is a single cut file used?

A. Mild steel
B. Ceramics
C. Aluminium
D. Leather
E. Tool steel

BM 2.5

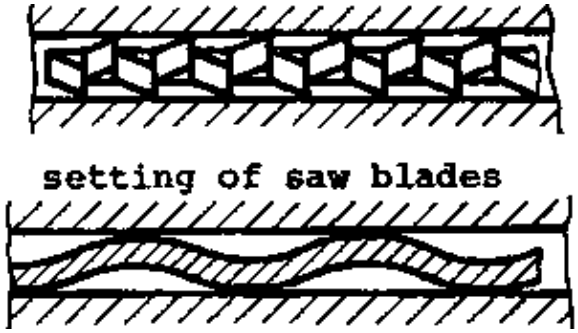
Which of the following materials cannot be bent?

A. Flat bar spring steel
B. Tool steel
C. Grey cast iron
D. PVC hard

BM 3.1

Why are saw blades set?

A. To avoid that the saw cut becomes wider than the saw blade
B. That long continuous chips can be formed.
C. To guarantee a proper free−cutting of the saw blade and to prevent the blade from being stuck up.
D. To allow for the cutting of metal sheets in their upright position. setting of saw blades



BM 3.2

Which of the following operations is usually carried out with this tool?

A. Scraping of plane surfaces.
B. Deburring of holes.
C. Scraping of sliding bearings.
D. Deburring of sheet metal workpieces.
E. Scraping of outside radii.

BM 3.3

What disadvantage has scraping as compared with grinding?

A. Hardened surfaces cannot be scraped.
B. Tools for scraping are more expensive than tools for grinding.
C. Only relatively small machine parts can be scraped.
D. During the scraping procedure workpieces are heated up to a higher degree than during grinding.

BM 3.4

For which of the following materials is a double cut file used?

A. Copper
B. Steel
C. Rubber
D. Leather
E. Aluminium

BM 4.1

Which of the following operations is usually carried out with this tool?

A. Deburring of bored holes.
B. Scraping of sliding bearings.
C. Deburring of straight edges.
D. Scraping of small plane surfaces.
E. Scraping of prismatic guideways.

BM 4.2

What is the proper procedure for checking the quality of scraped surfaces?

A. With a bevelled steel (straight edge).
B. With a measuring microscope.
C. By applying the surface contact method (using colour).
D. By sliding across the surface with the finger–nails.
E. By rubbing the surface on a hardened masterplate.

BM 4.3

For which purposes are needle files used?

A. For the production of needle bearings.
B. To clean soldered joints.
C. For the filing of small through holes in tools and dies.
D. For finishing hardened steel moulds.
E. For sharpening taps.

BM 4.4

Which of the following is a correct statement about milled files?

A. The top rake is always negative.
B. The top rake has a size of 0°.
C. Milled files can only be used for light metals.
D. The teeth of a milled file cut like the wedge of a chisel.
E. Milled files are only used in filing machines.

BM 5.1

Files are almost always cut in angular direction. Why?

A. The length of the cuts can be increased considerably.
B. A better flow of chips is achieved.
C. The stability of the file is increased.
D. This makes a file suitable for soft as well as for hard materials.
E. The production of files with angular cuts is easy and cheap.

BM 5.2

On a drawing the surface quality of a workpiece is indicated by one triangle (?).

Which of the following files is most suitable for this job?

A. Swiss pattern crossing file 250 × 4
B. Flat file 250 × 1
C. Flat file 250 × 5
D. Half round file 250 × 4
E. Knife file 250 × 3

BM 5.3

Which of the files mentioned below is suitable for hardened steel?

A. Double cut file
B. Needle file
C. Dead smooth file
D. Rasp cut file
E. None of these files.

BM 5.4

Which of the following must <u>not</u> be bent cold at right angles?

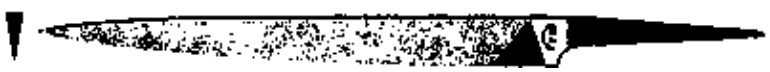
A. Copper sheet 2 × 10 × 100 long
B. Aluminium sheet 1 × 20 × 50 long
C. Square brass 16 × 200 long
D. Flat bar steel 2 × 12 × 80 long
E. Steel sheet 1.5 × 40 × 60 long

BM 5.5

Pipes of certain dias have to be filled before bending. Which of the following materials is most suitable for this purpose?

A. Kerosine
B. Steel chips
C. Grease
D. Quartz sand
E. Cotton waste

Picture a



Picture b

Picture c

Picture d

Picture e

Picture f

BM 6.1

Which picture shows a half round file?

A. picture a
B. picture b
C. picture e
D. picture f
E. none of the pictures

BM 6.2

Which picture shows a rasp?

A. picture a
B. picture c
C. picture e
D. picture f
E. none of the pictures

BM 6.3

Which picture shows a knife file?

A. picture a
B. picture b
C. picture c
D. picture f
E. none of the pictures

BM 6.4

Which picture shows files which are used for soft metals?

A. all pictures apart from d
B. pictures c to f
C. pictures c, e, f
D. only picture c
E. only picture

BM 7.1

Mushroom heads have to be removed in time.
Which is the main reason?

A. Because this mushroom head makes the hammer rebound when chiselling.

B. To avoid accidents.

C. Because this mushroom head makes it difficult to hit the chisel exactly in the direction of the centre line.

D. Because the mushroom head decreases the efficiency of the hammer stroke.

BM 7.2

Which statement about chiselling is correct?

A. Always watch the chisel head.

B. The hammer has to rebound after having hit the chisel head.

C. The chisel head has to have exactly the same hardness as the cutting edge.

D. The angle between the centre line of the chisel and the surface to be chiselled must not be smaller than 60°

E. When chiselling, always watch the cutting edge of the chisel.

BM 7.3

When sawing a workpiece held in a vice, always arrange the workpiece so that the cut is

A. 80 mm from the vice jaws.
B. above the vice jaws.
C. close to the edge of the vice jaws.
D. about 35 mm from the vice jaws.

BM 8.1

Two copper sheets have to be joined by riveting.

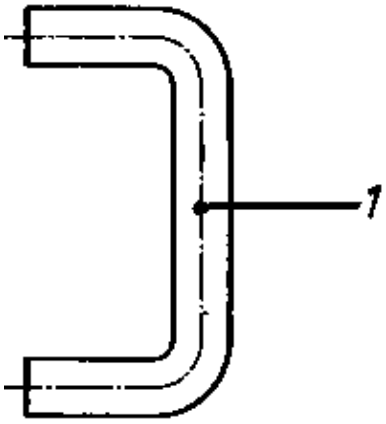
What should preferably be the material of the rivets?

A. Aluminium
B. Copper
C. Mild steel
D. Brass
E. Stainless steel

BM 8.2

Which of the following is the correct name for the line marked with '1'?

A. Bending line
B. Zero line
C. Tension fibre
D. Axis of symmetry
E. Neutral line



BM 8.3

The pitch (spacing) of a saw is the bigger

A. the harder the material that is to be sawed.
B. the softer the material that is to be sawed.
C. the shorter the length of cut is.
D. the thinner the sheet metal is, that must be cut.

BM 8.4

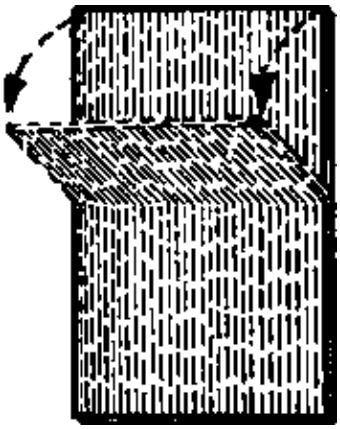
Which of the following is used for locking purposes?

A. Nut and bolt
B. Pins
C. Spring washer
D. Screws

BM 8.5

If we bend a sheet of metal across the direction of rolling instead of along the direction of rolling.

A. the bending force is reduced.
B. formation of cracks is lessened.
C. further work on the job is easier.
D. the neutral fibre is changed.
E. the central fibre is not changed.



BM 9.1

Below are given 4 methods of joining two steel pieces with each other.

Indicate which of these methods is <u>not</u> a permanent one.

A. Welding
B. Riveting
C. Brazing
D. Screwing

BM 9.2

A big spacing of the saw blade is required for

A. cast−iron
B. zinc
C. high carbon steel
D. aluminium

BM 9.3

A negative rake

A. can cause easier penetration of the cutting lip.
B. is mainly used for chisels and saw blades.
C. often goes together with a big wedge (lip) angle.
D. can occur only when cutting with a small lip clearance.

BM 9.4

The scraper removes very small chips because

A. the hand force works on one cutting lip only.
B. the contact points are scraped only during the last operation.
C. the scraper's cutting lip is very short.
D. the rake angle of the scraper is always negative.

BM 9.5

Which statement is incorrect?

A. Hand shears are used for steel sheets up to a thickness of 1.5 mm.
B. Shear blades are opened to a limited angle of 15°.
C. The blankholder is necessary only when circular cuts are made.
D. The burr is caused by the clearance between the blades being too wide.

BM 9.6

Tilting of the sheet metal between the blades while shearing, is avoided by

A. rounded blades.
B. increased clearance between the blades.
C. a blankholder.
D. a reduced wedge angle of only 60° of the shear blades.

BM 10.1

Shearing of brittle material is impossible because

A. it is too hard and would dull the shearing immediately.
B. it cannot be separated at all.
C. the cutting lines run out of control as it breaks before being notched.
D. this metal is not elastic enough.

BM 10.2

The clearance angle of hacksaw blades is comparatively large because

A. in this way we have a smaller rake angle.
B. sawing blades have always a short service life (breakage).
C. penetration of the blade into the material is easier.
D. there are only a few teeth cutting in most cases.

BM 10.3

A blade will be stuck up when

A. oil gets on the blade.
B. it is too tightly clamped.
C. the setting of teeth is worn.
D. the blade is reversed.

BM 10.4

A file “300 × 1”

A. is used for finishing a surface.
B. is used to file small keys and holes
C. is coarser than a file “300 × 4”.
D. is finer than a file “200 × 4”.

BM 10.5

With single−cut files

A. chip removal to one side is impossible.
B. we cut soft metals like aluminium.
C. the roughing of steel surfaces is easily done.
D. we always get negative rake angles.

BM 10.6

The bending radius can be smaller when

A. the material is colder while bent.
B. the material is very brittle.
C. the material is very thin.
D. the section to be bent is very long.

BM 11.1

The teeth of a double−cut file are cut under different angles in order to

A. improve the chip removal to one side.
B. give the teeth a negative rake angle.
C. make the teeth more stable.
D. prevent the teeth from standing in line behind each other parallel to the cutting direction.

BM 11.2

Which statement about sawing is correct?

A. While cutting thin−walled pipes, turn them against the cutting direction.
B. For thick−walled pipes the blades have coarser spacings than for thin−walled.
C. Brass is cut with a wider spacing than aluminium.
D. Set teeth permit free cutting of machine saw blades.

BM 11.3

In riveting it is incorrect that

A. copper can be used when hammered cold.
B. holes for hot rivets are usually drilled 1 mm larger than the rivet.
C. the length of the shaft depends on the shape of the head.
D. all steel rivets must be shaped when hot

BM 11.4

Which statement gives a correct information about the screw shown in the picture?

A. It can be used only once.
B. It is suitable for screwing sheet metal parts.
C. It is fixed by means of a hammer.
D. It can be fixed only by a special machine.
E. It is suitable for screwing wooden parts.

BM 12.1

When sawing tubes and profiles, preference is given to fine−toothed saw blades in order to

A. reduce the risk that less than three teeth cut at one time.
B. to simplify turning of the work during the sawing process.
C. to make breakage of teeth impossible.
D. to ensure a higher accuracy and avoid running off line.

BM 12.2

When sawing, use the

A. middle of the blade.
B. front end of blade.
C. full length of blade.
D. central 75 per cent of the blade.

BM 12.3

Which statement about bending is incorrect?

A. The neutral line runs through gravity centre (middle) of the cross section.
B. Bending of flat bars is easier when done in a hot state.
C. Thin sheet metal cannot be bent over a sharp edge.
D. Cold bending is possible when the metal is very ductile, like copper.

BM 12.4

Select the fastening method which belongs to the group of temporary fastening.

A. Hub and shaft, joined by a key.
B. Lever on a shaft, joined by brazing.
C. Two pieces of sheet metal, joined by rivets.
D. Bottom of a tin, joined by soldering.

BM 12.5

Which of the given threads is most suitable for preventing a screw from loosening itself?

A. Knuckle thread
B. Acme thread

C. Metric fine thread
D. Buttress thread
E. Metric thread

BM 13.1

For the efficient cutting of metal, hand sawing should be done at the rate of

A. 20 to 30 strokes per minute.
B. 30 to 40 strokes per minute.
C. 40 to 50 strokes per minute.
D. 50 to 60 strokes per minute.

BM 13.2

Which statement is incorrect?

A. Cracks occur easily when forging is done at too low a temperature.
B. Lowering of the temperature causes a louder sound from the hammer strokes.
C. A dark red colour indicates the temperature at which to begin forging.
D. Sulphur causes hot brittleness.

BM 13.3

When bending a thin walled pipe, buckling of the pipe can be avoided

A. by applying a small bending radius.
B. by using a spring to bend the hot pipe.
C. by hammering away the buckles after bending.
D. by using dry sand and closing the ends of the pipe with wooden plugs.

BM 13.4

Two paper washers (blotters) are to be put in between the grinding wheel and the flanges when a grinding wheel is mounted on the spindle. Which statement about these blotters is correct?

A. The blotters should be of very thin paper.
B. The blotters should be made of lead.
C. The diameters of the blotters should be more than the diameter of the flanges.
D. Blotters are required only when the diameter of the flanges differ.

BM 14.1

This machine element has to be fixed into a blind hole. Special care must be taken so that

A. grease is removed thoroughly.
B. there is a provision for the air to escape out of the blind hole.
C. a plastic hammer is used.
D. the machine element is washed in kerosene to avoid corrosion.
E. half the blind hole is filled with oil.

BM 14.2

Which statement gives a correct information about the screw shown in the picture?

A. It is very frequently used instead of hexagon bolts if there is little space available for tightening.
B. It should only be used for joining hardened parts.
C. It must be locked by means of a locking plate.
D. For safety reasons it should be used only once.

BM 14.3

Which statement about riveting is incorrect?

A. The rivet setter is used for drawing the sheets together.
B. Good hot riveting results in high pressure between the two sheets.
C. The friction between the sheets should replace the shearing stress on the rivet shaft.
D. For preparation of the drilled holes before riveting a special reamer with slow helix is used.

BM 14.4

After using a tool, the careful machinist places it

A. at the back of the bench.
B. close to the vice.
C. back in the tool box.
D. on top of his tool box.

BM 15.1

Forging results in

A. weakened structure and interrupted grain fibres.
B. a softer surface.
C. less consumption of material.
D. a reduced resistance to corrosion of the surface.

BM 15.2

To get a lasting deformation by bending

A. the elasticity limit (yield point) is surpassed.
B. the bar has to break at the outer side.
C. the sheet must be bent transversal to the rolling direction.
D. the tensile strength limit must be reached.

BM 15.3

Select the fastening method which belongs to the group of permanent fastening.

A. Two bars, joined by rivets.
B. Two bars, joined by bolts, nuts and spring washers.
C. Two bars, joined by bolts, nuts and plain washers.
D. Two bars, joined by tapered pins

BM 15.4

In forge welding, pieces are

A. fused.
B. heated up to a dark red colour.
C. heated up to plastic condition.
D. heated up to a red heat.

BM 15.5

In order to tighten a work piece securely in a vice

A. use the vice handle at its length.
B. force the vice handle with your foot.
C. place a pipe on the vice handle.
D. strike the vice handle with a lead hammer.

BM 15.6

The blade of a screw driver should be

A. made of cold drawn steel.
B. surface hardened.
C. made of cast steel.
D. hardend and tempered.

BM 16.1

Before using, if the handle of a hammer is loose

A. soak the handle in oil.
B. fit a new wedge.
C. drive the handle into the head.
D. burr the handle over the head.

BM 16.2

A hammer should be gripped or held

A. just below the head.
B. at the middle of handle.
C. at the extreme end of the handle.
D. about 20 mm from the end of the handle.

BM 16.3

While chipping the face of the hammer should be

A. coated with thin oil.
B. kept in cool water.
C. dry and clean.
D. covered with chalk.

BM 16.4

While chipping brittle metal, a chip screen is used to

A. cause the chips to rebound.
B. protect other workers in the shop.
C. save the scrap metal.
D. protect the windows in the shop.

BM 16.5

The mushroom on the head of a chisel

A. should be ground off.
B. should be broken off with a hammer.
C. prevents the chisel from slipping through the fingers.
D. makes the chisel easier to hit.

BM 16.6

It is dangerous practice to chip with a

A. blunt or dull chisel.
B. very sharp chisel.
C. unhardened chisel.
D. long chisel.

BM 17.1

When you are scraping metal with a flat scraper, the direction of cutting should be

A. away from you.
B. toward you.
C. at 45° to the left.
D. at 45° to the right.

BM 17.2

Before a file is used, the tang must be

A. covered with a handle.
B. ground smooth on the end.
C. filed to a sharp edge.
D. bent at a slight angle.

BM 17.3

In order to prevent your hand from striking the vice as the saw breaks through the work

A. apply more downward pressure.
B. remove the pressure.
C. apply a thin coating of oil on the blade.
D. cut on return stroke.

BM 17.4

When cutting a long thread with a die

A. remove the die from the stock.
B. adjust the height of the work in the vice.
C. make several adjustments in the depth of cut
D. use plenty of lubricant.

BM 17.5

Most accidents in bench work are the result of carelessness with

A. heavy tools.
B. flat tools.
C. round tools.
D. sharp tools.

BM 17.6

The sides of a correctly ground standard screw driver blade are

A. tapered.
B. chisel edged.
C. parallel.
D. wedge shaped.

BM 18.1

For general work use a hacksaw blade with

A. 14 teeth per inch.
B. 18 teeth per inch.
C. 24 teeth per inch.
D. 32 teeth per inch.

BM 18.2

For cutting thin metal, use a blade with

A. 14 teeth per inch.
B. 18 teeth per inch.
C. 24 teeth per inch.
D. 32 teeth per inch.

BM 18.3

When using the power saw to cut many pieces to the same length

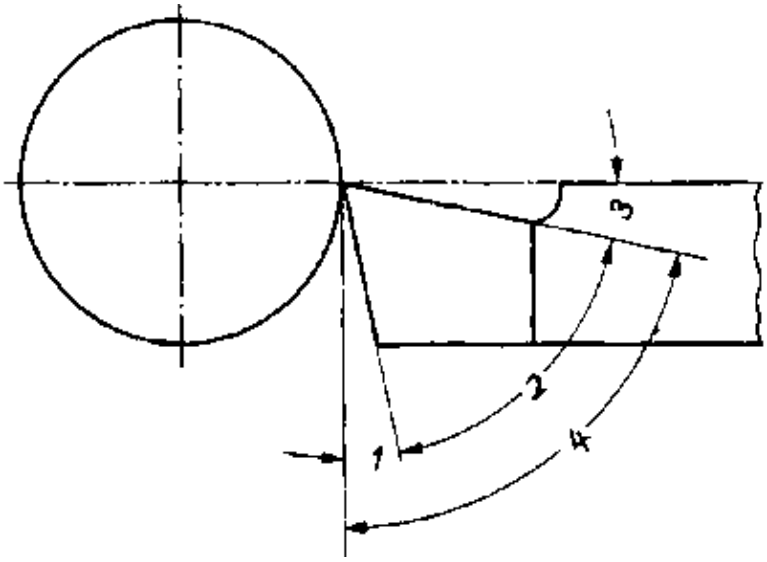
A. measure each piece accurately.
B. remove the burr from each piece.
C. set the stop for the required length.
D. measure as the saw takes first cut.

MACHINE TOOLS, GENERAL

MTG 1.1

What is the correct name for the angle marked with '3'?

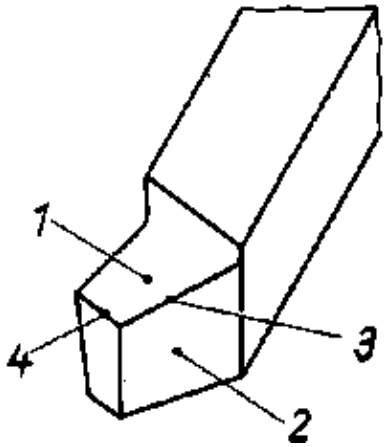
A. Angle of inclination
B. Rake angle
C. Cutting angle
D. Clearance angle
E. Top angle



MTG 1.2

What is the correct name for the surface marked with '1'?

A. Clearance face
B. Top face
C. Wedge face
D. Inclination face
E. Cutting face



MTG 1.3

The building–up edge at the top face of turning lathe tools is caused by

A. the lip clearance angle being too small.
B. the rake angle being too big.
C. the cutting speed being too low.
D. the cutting face being too smooth.

MTG 1.4

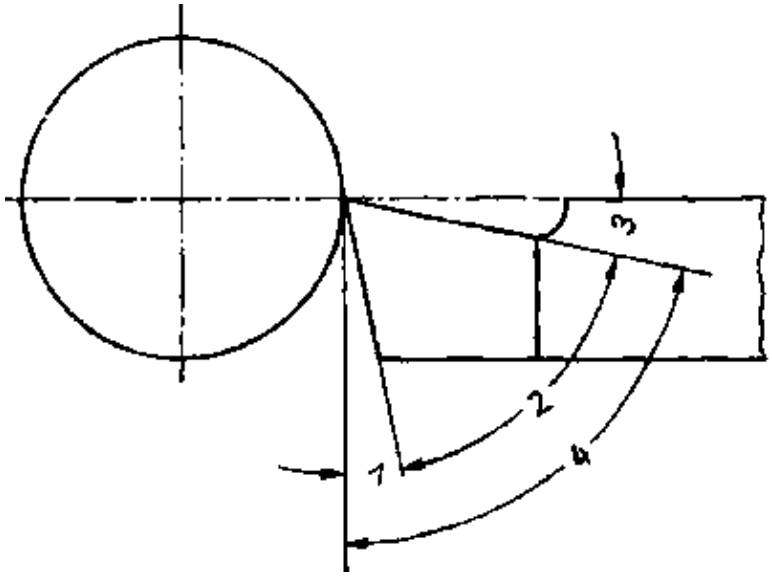
Long continuous chips occur when turning

A. ductile material at a very low speed.
B. steel with a certain sulphur content.
C. steel with a big rake angle at a high cutting speed.
D. the work with a negative rake angle.

MTG 2.1

What is the correct name for the angle marked with '2'?

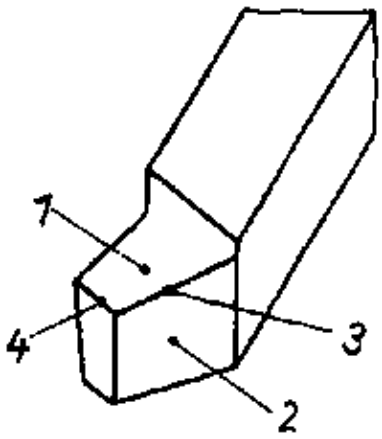
A. Wedge angle
B. Top angle
C. Cutting angle
D. Chip angle
E. Clearance angle



MTG 2.2

What is the correct name for the edge marked with '3'?

A. Chip edge
B. Wedge
C. Main cutting edge
D. Secondary cutting edge
E. Knife edge



MTG 2.3

The clearance angle of a lathe tool has to be

A. 0°
B. 2° – 3°
C. 6° – 8°
D. 15° – 20°
E. 90°
F. 45°

MTG 2.4

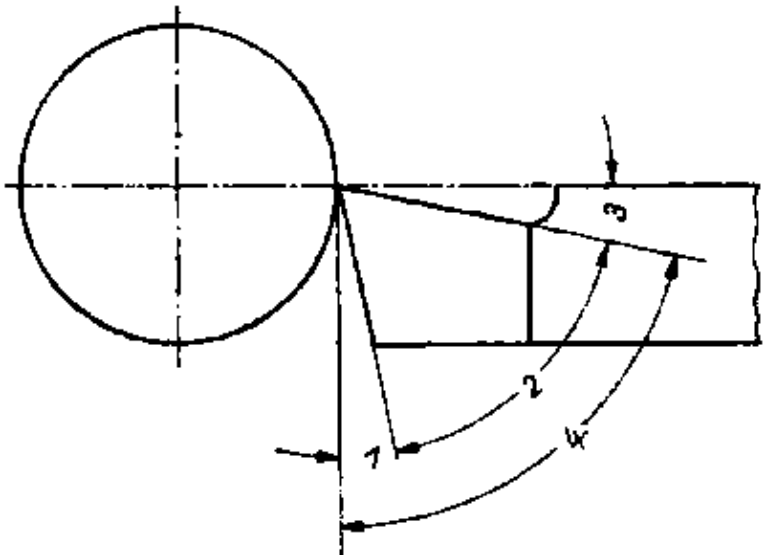
The size of the wedge (lip) angle of any cutting tool does not depend on the

A. hardness of the work.
B. service life of the tool.
C. thickness of the work.
D. cutting speed of the tool.

MTG 3.1

What is the correct name for the angle marked with '1'?

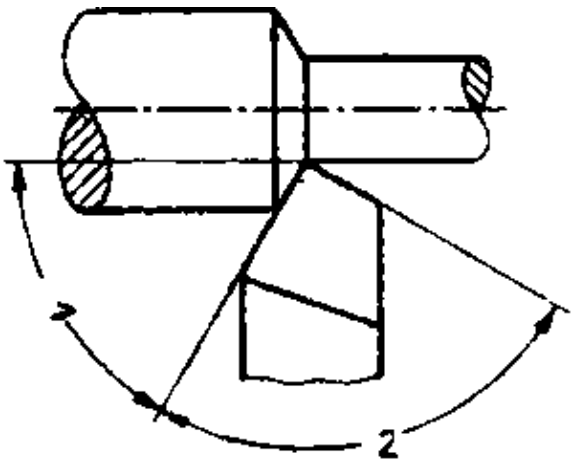
A. Setting angle
B. Cutting angle
C. Wedge angle
D. Clearance angle
E. Top angle



MTG 3.2

What is the correct name for the angle marked with '1'?

A. Top angle
B. Plan angle
C. Cutting angle
D. Inclination angle
E. Side angle



MTG 3.3

The main motion and the feed motion are produced by rotating tool when

A. turning.
B. milling.
C. drilling.
D. shaping.

MTG 3.4

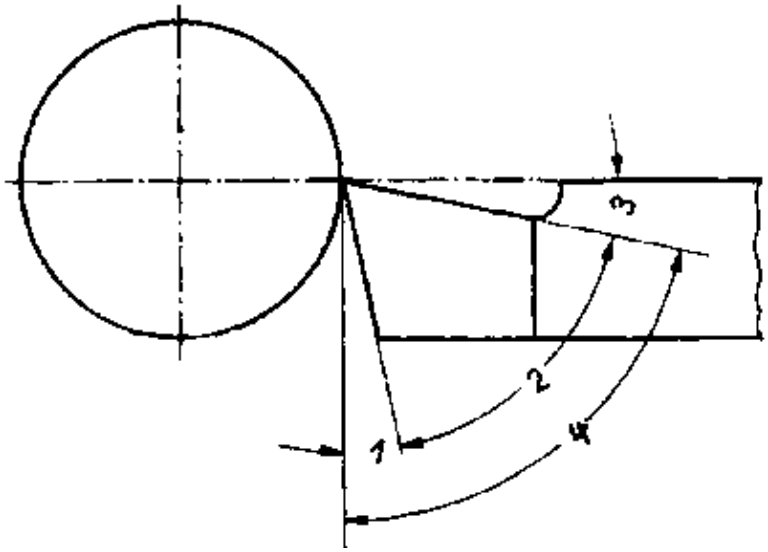
Which is the advantage of a big wedge angle of a tool for machining steel?

A. Long service life
B. Short service life
C. High amount of force necessary
D. Low amount of force necessary
E. Good flow of chips

MTG 4.1

What is the correct name for the angle marked with '4'?

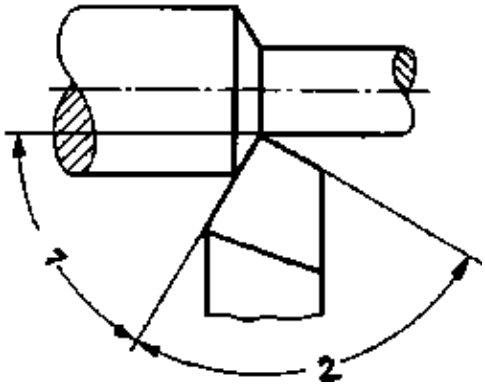
A. Plan angle
B. Setting angle
C. Cutting angle
D. Wedge angle
E. Inclination angle



MTG 4.2

What is the correct name for the angle marked with '2'?

A. Cutting angle
B. Wedge angle
C. Nose angle
D. Chip angle
E. Side angle



MTG 4.3

Which of the following techniques, if properly carried out, results in the highest surface quality and the greatest accuracy?

A. Scraping
B. Fine milling with cutter with inserted blades.
C. Precision surface grinding
D. Lapping
E. Broaching

MTG 4.4

For which of the following production techniques is a mixture of grinding material and kerosene oil used?

A. Lapping
B. Honing
C. Broaching
D. Electroerosion

MTG 5.1

What is the correct name for cutting tools shown in the picture?

A. Gun–core drill
B. Broach
C. Lapping mandrel
D. Polishing tool
E. Boring bar

MTG 5.2

Which of the following is a special characteristic of honed surfaces?

A. They have a mirror like surface.
B. They show crosswise overlapping finishing marks.
C. They show finishing marks similar to those of turned surfaces.
D. They show exactly parallel finishing marks.
E. They show finishing marks similar to those of sandblasted surfaces.

MTG 5.3

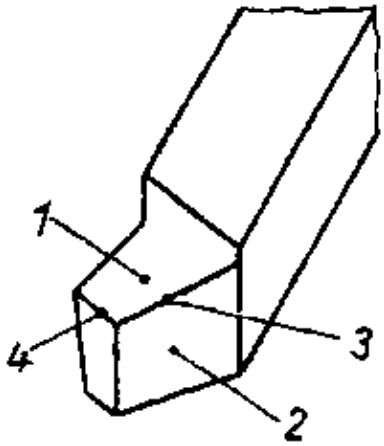
Which of the following tool angles are changed if the lathe tool is set above or below the centre of the workpiece?

A. Top rake and clearance angle.
B. Wedge angle and clearance angle.
C. Wedge angle and top rake angle.
D. Cutting angle and wedge angle.
E. Cutting angle and setting angle.

MTG 6.1

What is the name of the surface marked with '2'?

A. Clearance face
B. Chip face
C. Wedge face
E. Base face



MTG 6.2

Feed motion and depth setting motion are performed by the workpiece when

A. planing.
B. milling
C. shaping.
D. turning.

MTG 6.3

Assume that the clearance angle of a lathe tool is 8°. The top rake is 15°. What will be the size of the wedge angle?

A. 67°
B. 23°
C. 7°

D. 15°
E. 8°
F. 90°

MTG 6.4

Compared with HSS−tools the maximum speed for turning with cemented carbide tools is

A. nearly the same.
B. 3 to 4 times higher.
C. 5 to 10 times higher.
D. 10 to 20 times higher.

MTG 6.5

The size of the wedge angle of machine cutting tools is mainly dependent on the

A. feed.
B. thickness of chips.
C. cutting depth.
D. cooling and lubrication process.
E. properties of the material which is to be machined.

MTG 6.6

Which of the given inclinations is usually applied to tapered keys?

A. 1: 5
B. 1: 10
C. 1: 20
D. 1: 50
E. 1: 100

MTG 7.1

A lathe tool has a clearance angle of 7°. The wedge angle was found to be 70°.

What is the size of the top rake?

A. 77°
B. 63°
C. 90°
D. 7°
E. 13°

MTG 7.2

If the tool is not changed and the same service life is required, the cutting speed for mild steel is

A. higher than the one for aluminium−alloys.
B. lower than the one for high−carbon steel.
C. higher than the one for alloyed steel.
D. higher than the one for brass.

MTG 7.3

To find the correct theoretical cutting speed we need <u>not</u> know

A. the hardness of the workpiece.
B. the range of revolutions of the machine tool.
C. the red hardness (temperature limit) of the tool.
D. the kind and intensity of the coolant.

MTG 7.4

Which of the given point angles is not correct for the drilling of the material?

A. Copper	140°
B. Unalloyed and alloyed steel up to 700 N/mm^2	118°
C. Grey cast iron	118°
D. Plastic	80° – 140°
E. Aluminium	65°

MTG 7.5

The maximum cutting speed for drilling is lower than that for turning because of

A. the higher number of revolutions of any lathe.
B. the smaller diameter of the drills.
C. the better removal of the hot chips when turning.
D. the simpler tool for turning having only one cutting lip.

MTG 8.1

What statement about the top rake is correct?

A. A great top rake avoids breaking of the wedge.
B. A small top rake is to be used for hard material
C. A small top rake gives continuous chips.
D. A great top rake results in a long service life.

MTG 8.2

A small wedge angle (lip angle) of the chisel causes a

A. long service life.
B. strong resistance to penetration.
C. high risk of breakage.
D. very accurate surface.

MTG 8.3

HSS–tools loose their hardness when cutting at a temperature of

A. 300°C
B. 600°C
C. 800 C
D. 1000°C

MTG 8.4

The disadvantage of a lip clearance angle being too big is

A. the increased friction between cutting lip and work.
B. the reduced wedge angle (lip angle) when the rake is unchanged.
C. that the service life gets too long.
D. the increased difficulty in chip removal at the top face.

MTG 8.5

There is no need for changing the number of revolutions when turning

A. a small diameter of the workpiece.
B. another workpiece which is harder than the previous one.
C. a new workpiece which is longer than the previous one.
D. with a new tool of cemented carbide after using HSS–tools first.

MTG 8.6

The friction between the cutting lip of the tool and the surface of the work is reduced by the

A. wedge angle (lip angle).
B. lip clearance angle.
C. rake angle.
D. point angle.

MTG 9.1

Which statement about the wedge angle is correct?

A. The softer the material of the job, the smaller the wedge angle might be ground.
B. The greater the wedge angle, the less friction will occur.
C. The harder the material of the job, the smaller the wedge angle might be ground.
D. The greater the wedge angle, the higher should the cutting speed be.

MTG 9.2

The permissible cutting speed does <u>not</u> depend on the

A. the service life of the tool.
B. the kind of cutting operation (roughing or smoothening).
C. the hardness and strength of the work.
D. the length of the work.

MTG 9.3

Only a small lip clearance angle is necessary for cutting

A. hard and brittle materials.
B. ductile and soft materials.
C. malleable and elastic materials.
D. strong and heavy materials.

MTG 9.4

The creation of large holes in sheet metal is possible by using the

A. cross–cut chisel.
B. round chisel (hewing chisel).
C. flat chisel.
D. grooving chisel.

MTG 9.5

The service life of a tool is defined as the

A. time between the beginning of the work and the end of the job.
B. full time between two grinding operations.
C. cutting operation time between two resharpening operations.
D. working time of the worker using the tool.

MACHINE ELEMENTS

ME 1.1

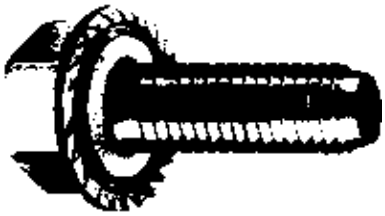
Which of the following is the correct name for this screw?

A. Cheese head screw
B. Shoulder stud
C. Hexagon set screw
D. Hexagon bolt
E. Hexagon fitting bolt

ME 1.2

Which of the following is a correct statement about this screw?

A. It must be used in connection with a toothed disk only.
B. It can be used only once.
C. It must be used together with a washer.
D. It is self locking.
E. It can be used for screwing soft materials only.



ME 1.3

Which of the following is the correct name for this nut?

A. Round nut
B. O–nut
C. Eye nut
D. Cap nut
E. Wing nut

ME 1.4

A screw joint has to be designed in such a way that it can be opened and closed by hand without using a tool.

Which of the following nuts has to be used for this joint?

A. Cap nut
B. Slotted nut
C. Knurled nut

D. Castle nut
E. Eye nut

ME 1.5

A gear has to be fixed on a shaft. Which of the following machine elements is suitable, if the gear is supposed to run absolutely true?

A. Tapered key
B. Gib key
C. Hollow saddle key
D. Parallel key
E. Tangent key

ME 2.1

Which of the following is the correct name for this screw?

A. Stud bolt
B. Shoulder stud
C. Screw bolt
D. Fitting bolt
E. Cheese−head screw

ME 2.2

Which of the following is the correct name for this nut?

A. Cap nut
B. Round nut
C. Half round nut
D. Stop nut
E. High hexagon nut

ME 2.3

The height of a normal hexagon nut is approximately equal to

A. 5 × pitch of the thread.
B. 0.8 × outside dia of the thread.
C. 0.5 × width over flats.
D. 0.8 × core dia of the thread.
E. 1.5 × outside dia of the thread.

ME 2.4

Which of the following screw locking devices damages the surface of the workpiece?

A. Fan disk
B. Spring plate
C. Split pin

D. Tab washer
E. Snaked wire

ME 2.5

Which of the followings is an essential difference between parallel keys and tapered keys?

A. Tapered keys can bear a much higher shearing stress.
B. In contrast to parallel keys, tapered keys do not create contact pressure between shaft and hub.
C. Parallel keys do not create contact pressure between shaft and hub.
D. Parallel keys are hardened, tapered keys are unhardened.

ME 3.1

Which of the following is the correct name for this screw?

A. Wood screw
B. Tapping screw
C. Plastic screw
D. Clamping screw

ME 3.2

Which of the following is the correct name for this nut?

A. Slotted nut
B. Nut for keyed end
C. Cross hole nut
D. Castle nut
E. Lock nut

ME 3.3

Which of the following spanners cannot be used for tightening a hexagon nut?

A. Fixed spanner
B. Ring spanner
C. Socket wrench
D. Hook spanner
E. Double head spanner

ME 3.4

Which of the following is a method of locking screws smaller than M4 and commonly used in precision engineering?

A. With spring washers
B. With lacquer coating
C. With wire

D. By riveting
E. By soldering

ME 3.5

Which of the following is a correct statement about this machine element?

A. There is no need to ream the hole.
B. It cannot be used again.
C. The hole has to be reamed with a tapered shank reamer.
D. It has to be entered in the hole at the portion marked with '2'.
E. This machine element is always hardened and ground.

ME 4.1

Which of the following is the correct name for this screw?

A. Fitting bolt with internal hexagon.
B. Shoulder stud with internal hexagon.
C. Expansion screw with internal hexagon.
D. Countersunk screw with internal hexagon.
E. Socket head cap screw.

ME 4.2

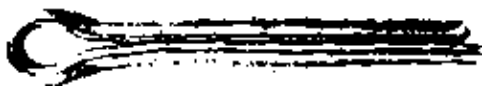
Which of the following nuts is usually locked by means of a split pin?

A. Cap nut
B. Slotted nut
C. Nut for keyed end
D. Eye nut
E. Castle nut

ME 4.3

Which of the following is the correct name for this machine element?

A. Grooved pin
B. Clamping pin
C. Notched nail
D. Split pin
E. Shearing pin



ME 4.4

Which of the following is a correct statement about riveting?

A. Riveting is a temporary type of joining.
B. In modern technology welding is more and more replaced by riveting.
C. Riveted joints can only bear minor tensile stresses.
D. Riveting is a permanent type of joining.
E. Riveted joints can be up to 40 % lighter in weight than welded joints.

ME 4.5

A woodruff key is used to

A. transmit heavy powers.
B. transmit medium powers.
C. transmit low powers.
D. prevent axial movement.

ME 5.1

Which of the following is the correct name for this screw?

A. Flat head wood screw
B. Tapping screw
C. Self–tapping screw for plastic
D. Nail screw with slot

ME 5.2

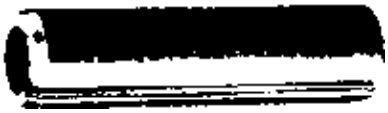
Which of the following is a correct statement about this nut?

A. This nut usually is brazed to sheets of less than 1 mm thickness.
B. This nut is self–locking.
C. This nut usually is welded to sheet metal parts.
D. This nut is locked by means of riveting.
E. This nut is mainly used for plastic parts.

ME 5.3

When this machine element is fixed special attention has to be taken to ensure

A. that the hole has been reamed with a taper shank reamer 1:10.
B. that the position of the slot is correct.
C. that the hole is exactly 0.1 – 0.2 mm smaller than the nominal dia.
D. that the ends are carefully riveted after the machine element is in its correct position.



ME 5.4

Which of the following machine elements is usually made of spring steel?

A. Grooved pin
B. Clamping sleeve
C. Cylindrical pin
D. Hollow type rivet
E. Notched nail

ME 5.5

Which of the following fluids must not be used for cleaning of rolling bearings?

A. Caustic soda solution (10 %)
B. Petrol
C. Wash oil
D. Water

ME 6.1

How is it possible to find out which ISO tolerances the different types of cylindrical pins have?

A. From the surface quality of the top and bottom face.
B. Prom the marking letters on their top face.
C. From the surface quality of the cylindrical portion.
D. From the shape of their ends.
E. The ISO tolerances have to be found out by measuring.

ME 6.2

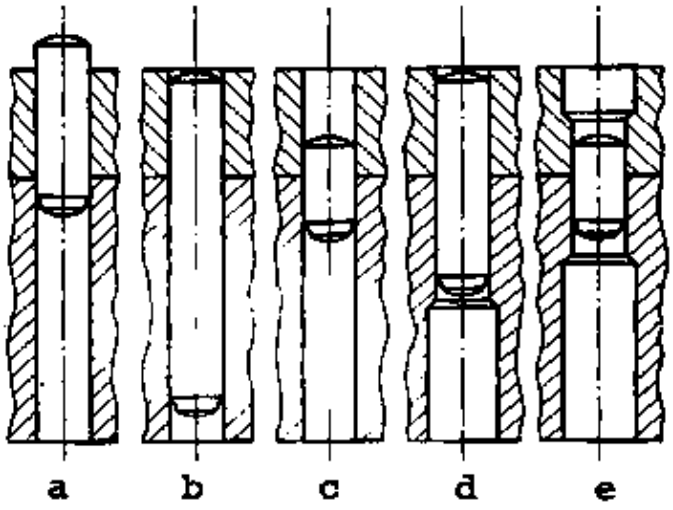
What advantage has a riveted joint in comparison with a welded joint?

A. The two connected parts can be separated easily if necessary.
B. Riveting does not weaken the bearing cross section of the joint.
C. It is much more resistant against corrosion.
D. It is much more durable.
E. It is easier and cheaper in production.

ME 6.3

Which of the pictures shows a correct pin joint?

A. picture a
B. picture b
C. picture c
D. picture d
E. picture e



ME 6.4

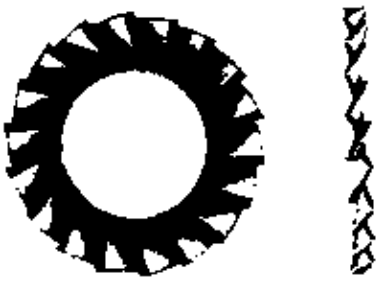
Which of the following is the correct name for this screw?

A. Collar screw with square
B. Shoulder bolt
C. Cup square bolt
D. Wood screw with square
E. Stone bolt

ME 7.1

Which of the following is the correct name for this machine element?

A. Toothed disk
B. Fan disk
C. Spring washer
D. Star disk
E. Hook spring ring



ME 7.2

Which of the following is a correct statement about this machine element?

A. It is mainly used for sheet metal construction.
B. It guarantees a good fit even for great tolerances.
C. The hole has to be reamed properly.
D. For safety reasons it must not be used for joining hardened parts.
E. It can be used only once.

ME 7.3

Which of the following relations of inclinations is normally used for tapered keys?

A. 1: 5
B. 1: 10
C. 1: 20
D. 1: 50
E. 1: 100

ME 7.4

Which of the following is the correct name for this machine part?

A. Flat key
B. Tapered key
C. Round key
D. Woodruff key
E. Parallel key

ME 8.1

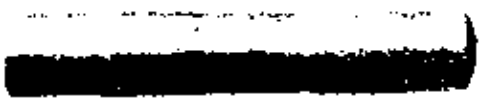
Which of the following is the correct name for this machine part?

A. Star disk
B. Spring washer
C. Toothed washer
D. Spring ring
E. Locking plate

ME 8.2

Which machine element does this picture show?

A. Pin
B. Fitting pin
C. Locking pin
D. Clamping pin
E. Cylindrical pin



ME 8.3

Springs cannot be used

A. for storing energy.
B. for shock absorption.
C. for generation of occillations.
D. as a flexible coupling element.
E. for generation of energy.

ME 8.4

Which of the following is a correct statement about roller bearings?

A. Roller bearings have a high consumption of lubricant.
B. Roller bearings do not allow for high numbers of revolutions.
C. Roller bearings have only a small starting resistance.
D. Roller bearings require high maintenance costs.
E. Roller bearings are not sensitive against strong shocks.

ME 8.5

To make the fitting operation easier, roller bearings are heated up to 80°C. Which is the proper way to heat them up?

A. With blow lamp.
B. In hot water.
C. In hot oil.
D. With an electric soldering iron.
E. In hot sand.

ME 9.1

What is this nut used for?

A. For screw joints which have to be tightened with a high initial stress.
B. For screw joints which must be unsensitive to shocks.
C. For screw joints which are locked by means of toothed disks.
D. For screw joints, the ends of which have to be protected against damage.
E. For air tight screw joints.

ME 9.2

Which of the following is the correct name for this machine element?

A. Lock nut
B. Sheet metal nut
C. Spring nut
D. Toothed nut

ME 9.3

Where is this machine element mainly used?

A. As a riveting pin in mass production.
B. As a shearing pin in machine tools.
C. As a fitting pin in tool and die making.
D. As a coupling pin for hinges.
E. As a safety pin for high shearing forces.

ME 9.4

What is the name of the spring shown here?

A. Spiral spring
B. Screw spring
C. Tension spring
D. Compression spring

ME 10.1

What is the name of the spring shown here?

A. Helical spring
B. Conical spiral spring
C. Leaf spring
D. Laminated spring

ME 10.2

Which of the following is the correct name for this machine element?

A. Spring washer
B. Clamping ring
C. Toothed disk
D. Spring ring
E. Claw disk

ME 10.3

Compression springs are produced on a lathe machine (∅ of the spring wire 1 mm). Which of the given treatments has to be applied to the ends of the springs?

A. Filing.
B. Heating up with the welding torch.
C. Facing on the lathe.
D. Grinding at right angle.
E. The ends of compression springs do not need any further treatment. They are just cut off.

ME 10.4

Which of the following bearings allows for an adjustment of the clearance between outer and inner rings during the mounting operation?

A. Cylindrical roller bearing
B. Self aligning roller bearing
C. Grooved ball bearing
D. Tapered roller bearing
E. Needle bearing

ME 11.1

Which of the following is the correct name for this machine element?

A. Angular disk
B. Tab washer
C. Fan disk
D. Locking disk
E. Nose disk

ME 11.2

What is the name of the spring shown here?

A. Blade spring
B. Bending spring
C. Leaf spring
D. Disk spring
E. Flat spring

ME 11.3

Which of the following is a correct statement about this bearing?

A. This bearing is suitable for an axial load only.
B. This roller bearing can compensate misalignment.
C. This roller bearing can be used for small numbers of revolutions (below 500 rev./min) only.
D. This roller bearing is suitable for a radial load only.
E. Clearance between outer and inner rings can be adjusted by shifting the outer ring.

ME 11.4

What advantage have sliding bearings as compared with roller bearings?

A. Sliding bearings have a smaller consumption of lubricants.
B. Sliding bearings do not require maintenance.
C. Sliding bearings have a small starting resistance.
D. Sliding bearings are less sensitive to shocks.
E. Sliding bearings have a very minor frictional resistance.

ME 12.1

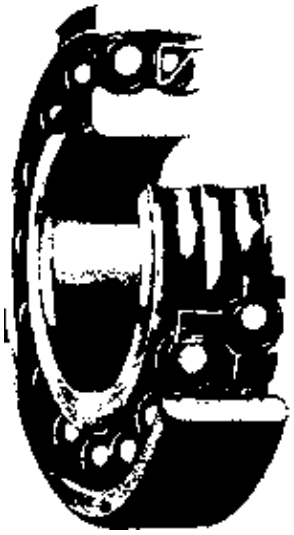
Which of the following is a correct name for this machine element?

A. Peg feather key
B. Tapered key
C. Gib key
D. Cotter

ME 12.2

What is the correct name for this bearing?

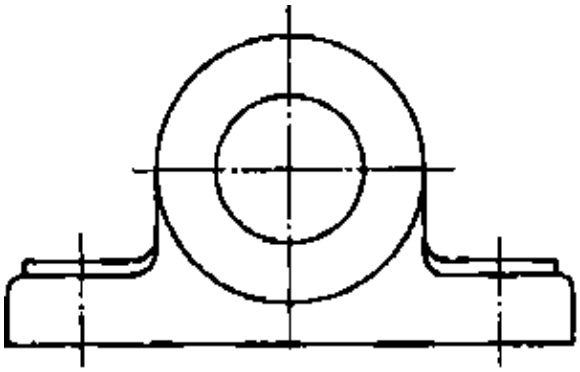
A. Twin row grooved ball bearing
B. Self aligning ball bearing
C. Twin row detachable ball journal bearing
D. Self aligning roller bearing



ME 12.3

What is the correct name for the sketched bearing?

A. Flanged bearing
B. Pedestal bearing
C. Solid journal bearing
D. Hemispherical bearing support
E. Thrust block



ME 12.4

Which of the following is a correct statement about the module of a gear?

A. The greater the module, the smaller the pitch.
B. The module is a factor for calculation without dimension.
C. Module 1 is equivalent to a height of 1 cm of a tooth.
D. Module 1 is equivalent to a pitch of 1 mm measured at the top circle.
E. Module 1 is equal to a pitch of 3.14 mm measured as a distance on the pitch circle.

ME 13.1

A gear is to be machined on a milling machine by using the indexing method.

How can the cutting depth be calculated?

$$A.\,\text{Cutting depth} = \frac{\text{module}}{\text{no. of teeth}}$$

B. Cutting depth = module × ?

C. Cutting depth = module × 0.866

D. $\text{Cutting depth} = \frac{13}{6} \times \text{module}$

C. It has to be taken from the tables.

ME 13.2

Which of the following is the correct name for this machine element?

A. Round key
B. Parallel key
C. Tapered key
D. Hollow saddle key
E. Cotter

ME 13.3

What is the correct name for this bearing?

A. Roller bearing
B. Needle bearing
C. Detachable roller journal bearing
D. Thrust bearing
E. Axial roller bearing

ME 13.4

Which of the following shafts can, if connected accordingly, transform a straight motion into a rotary motion?

A. Spline shaft
B. Flexible shaft
C. Crank shaft
D. Cam shaft

ME 14.1

Which of the following is the correct name for this machine element?

A. Double key
B. Cotter
C. Tangent key
D. Tapered key
E. Sliding key

ME 14.2

What is the correct name for this bearing?

A. Axial grooved ball bearing
B. Roller bearing
C. Barrel shaped roller bearing
D. Self aligning roller bearing
E. Tapered roller bearing

ME 14.3

Which is the correct name for this gear wheel?

A. Star wheel
B. Pinion
C. Planet pinion
D. Chain wheel

ME 15.1

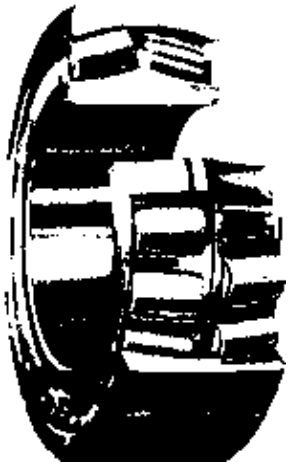
Which of the following is the correct name for this machine element?

A. Half round key
B. Round key
C. Woodruff key
D. Hollow key
E. Laid–in key

ME 15.2

What is the correct name for this bearing?

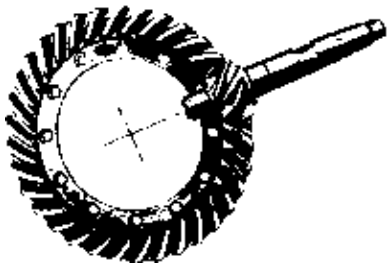
A. Self aligning ball bearing
B. Detachable roller journal ball bearing
C. Cylindrical roller bearing
D. Self aligning roller bearing
E. Thrust bearing



ME 15.3

What is the correct name for this gear drive?

A. Differential gearing
B. Angular drive
C. Hypoid drive
D. Planetary gearing
E. Worm drive



ME 16.1

What is the correct name for this bearing?

A. Detachable ball journal bearing
B. Grooved ball bearing
C. Axial ball bearing
D. Self aligning ball bearing

ME 16.2

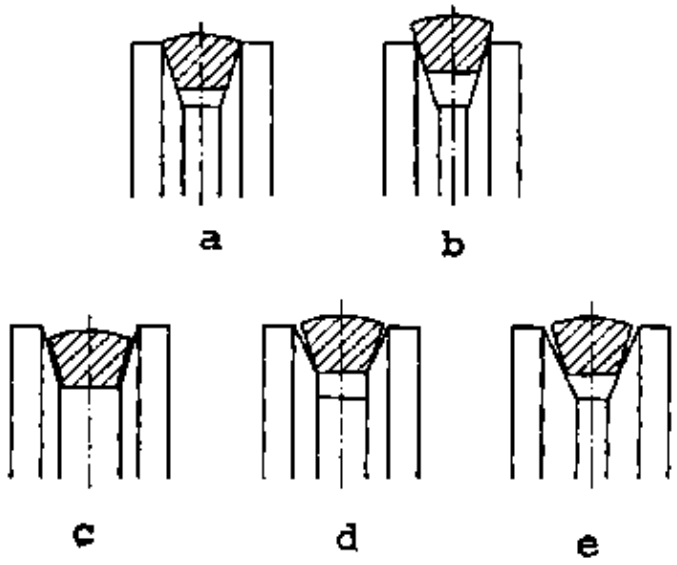
What is the correct name for this gear drive?

A. Screw gearing
B. Planetary gearing
C. Hypoid drive
D. Worm drive
E. Differential gearing

ME 16.3

Which of the pictures shows a correct V–groove?

A. picture a
B. picture b
C. picture c
D. picture d
E. picture e



ME 17.1

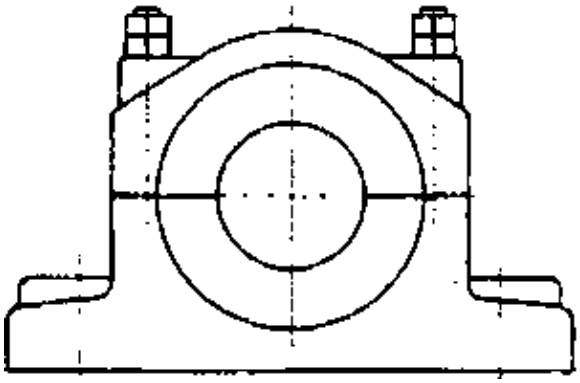
What is the correct name for this bearing?

A. Detachable roller journal bearing
B. Grooved ball bearing
C. Thrust ball bearing
D. Self aligning ball bearing

ME 17.2

What is the correct name for the sketched bearing?

A. Solid journal bearing
B. Pedestal bearing
C. Flanged bearing
D. Hemispherical bearing



ME 17.3

What is the correct name for this coupling?

A. Multiple disk clutch
B. Flange coupling
C. Sleeve coupling
D. Slipping clutch

ME 18.1

What is the correct name for this bearing?

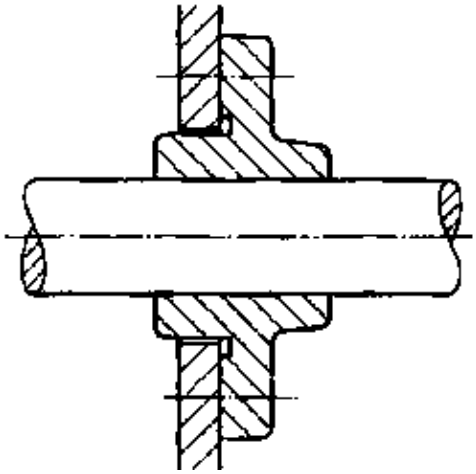
A. Needle bearing
B. Barrel shaped roller bearing
C. Cylindrical roller bearing
D. Self aligning roller bearing

ME 18.2

What is the correct name for the sketched bearing?

A. Hemispherical bearing support
B. Pedestal bearing
C. Solid journal bearing

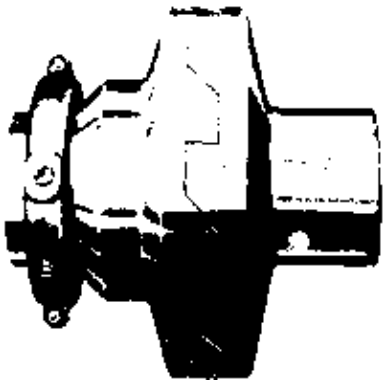
D. Flanged bearing



ME 18.3

What is the correct name for this coupling?

A. Claw clutch
B. Multiple disk clutch
C. Gear coupling
D. Slipping coupling



ME 19.1

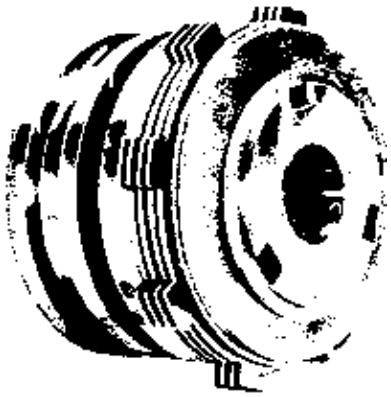
Which of the following is a correct statement about this bearing?

A. This ball bearing can compensate misalignment.
B. This bearing is suitable for a radial load only.
C. This ball bearing has to be mounted together with a grooved ball bearing.
D. This ball bearing is suitable for an axial load only.
E. This ball bearing has to be lubricated with oil.

ME 19.2

What is the correct name for this coupling?

A. Flange coupling
B. Multiple disk clutch
C. Sleeve coupling
D. Claw clutch
E. Centrifugal clutch



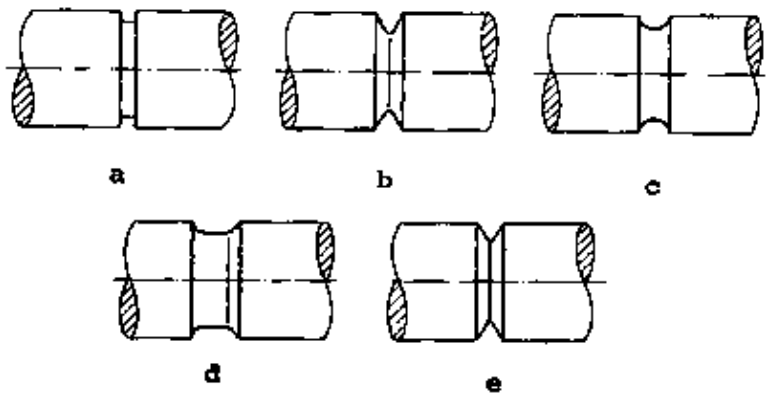
ME 19.3

What is the correct name for this machine element?

A. Clamping disk
B. Fan disk
C. Locking washer
D. Spring washer

ME 20.1

Which of these grooves has the greatest notch–effect?



A. Groove in picture a
B. Groove in picture b
C. Groove in picture c
D. Groove in picture d
E. Groove in picture e

ME 20.2

What is the correct name for this machine element?

A. Ball joint
B. Cross joint
C. Grease box
D. Drip oiler
E. Grease nipple

ME 20.3

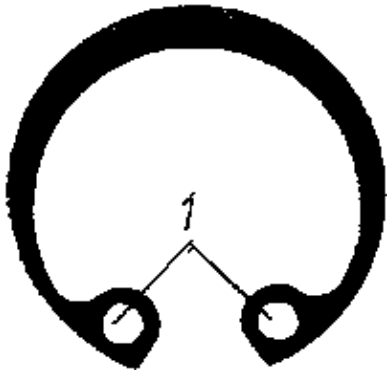
What is the difference between parallel keys and tapered keys?

A. The method of fixing in the shaft.
B. Parallel keys have a force fit in the shaft, tapered keys have a force fit in the hub.
C. Parallel keys do not create a pressure acting between shaft and hub.
D. Parallel keys are hardened, tapered keys are unhardened.

ME 21.1

Which is the purpose of the holes marked with '1'?

A. For wire–locking
B. For screwing, after the machine element is brought in the correct position.
C. For mounting and dismounting.
D. For fixing cylindrical pins.



ME 21.2

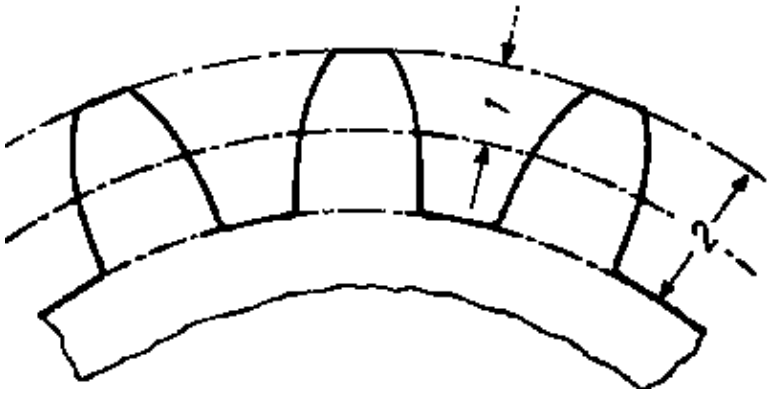
In a locating bearing, the shaft can only move in

A. a radial direction.
B. an axial direction.
C. radial and axial direction.
D. neither direction.

ME 21.3

What is the correct expression for the distance marked with '1'?

A. Distance of pitch dia.
B. Pitch
C. Cutting depth
D. Addendum
E. Distance of tooth flanks



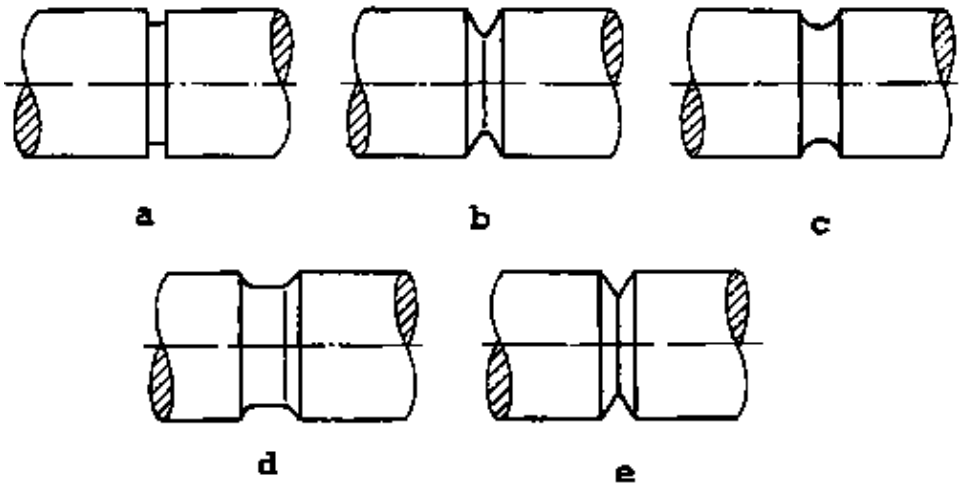
ME 21.4

Balls used in ball bearing are

A. ductile.
B. hard and brittle.
C. hard and tough.
D. malleable.

ME 22.1

Which of these pictures shows a shaft with a groove for a locking washer?



A. picture a
B. picture b
C. picture c
D. picture d
E. picture e

ME 22.2

Which are important characteristics of herring bone gears?

A. Loud noises when running.
B. Applicable only for the transmission of small forces.
C. No axial pressure and quite running.
D. Easy and cheap production.
E. One sided pressure in axial direction.

ME 22.3

Which of the following properties is not correct for a gear drive?

A. Infinitely variable regulation of numbers of revolutions.
B. Transmission of high forces.
C. No slippage.
D. Possibility of changing the number of revolutions.

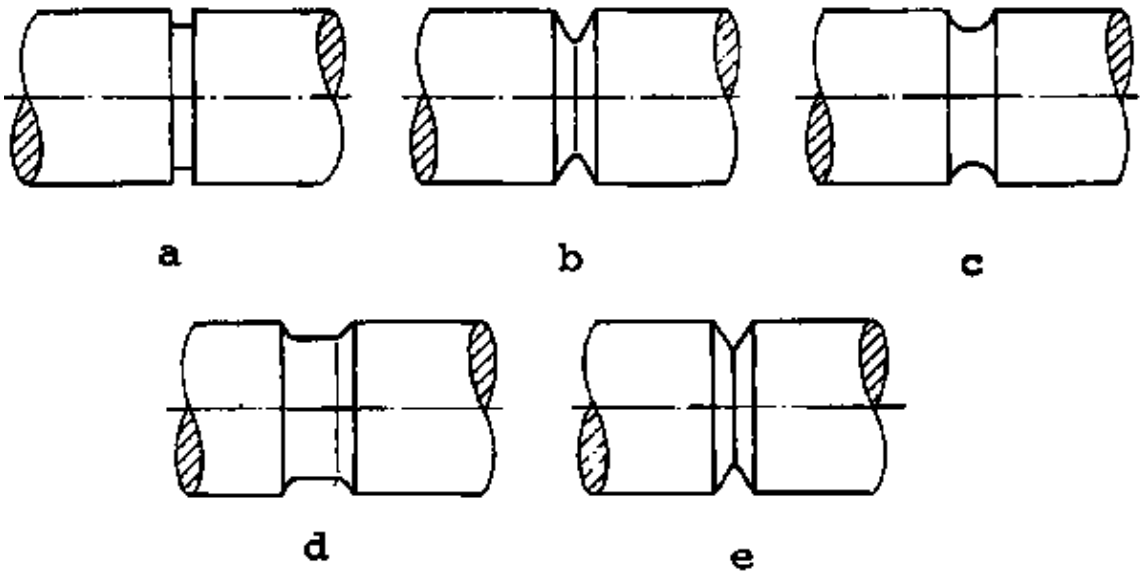
ME 22.4

Slide bearings are sometimes not suitable because

A. they are expensive.
B. much axial space is required.
C. they are noisy.
D. they have a shorter service life.

ME 23.1

Which of these pictures shows a shaft with a thread groove?



A. picture a
B. picture b
C. picture c
D. picture d
E. picture e

ME 23.2

What is the purpose of the hexagon nut marked with '1'?

A. It makes a quick and easy mounting possible.
B. It protects the threaded end of the pin from damage.
C. It is an additional security device holding the pin in the pinhole.
D. It makes the removal of the pin out of blind holes easier.

ME 23.3

In a sliding bearing the oil hole is placed

A. on the pressure area.
B. at 180° to the pressure area.
C. at 90° to the pressure area.
D. at 270° to the pressure area.

ME 24.1

A long shaft has always

A. one floating bearing and several locating bearings.
B. one locating and several floating bearings.
C. only locating bearings.
D. only floating bearings.

ME 24.2

A pin is a

A. locking device.
B. clamping device.
C. connecting device.
D. supporting device.

ME 24.3

What is this machine element used for?

A. For locking highly stressed screw joints.
B. As locking ring on shafts and axles.
C. As sealing washer in pumps, engines, etc.
D. As locking ring in cylindrical holes.
E. As spring for returning levers.

ME 24.4

What is this screw used for?

A. For fixing wooden and metal parts together.
B. As fitting screw in steel constructions.
C. For fixing machine tools on concrete foundations.
D. For joining aluminium sheets.

ME 24.5

Which gear–drive achieves great transmission ratios?

A. Helical gear–drive
B. Bevel gear–drive
C. Worm gear–drive
D. Spur gear–drive

ME 24.6

A chain on a chain wheel is a

A. clamping device.
B. power transmitting device.
C. connecting device.
D. supporting device.

ME 25.1

What is this machine element used for?

A. For locking screw joints.
B. As stripper in punching dies.
C. As radial pressure bearing.

D. As oil seal.
E. As sliding bearing for high speed shafts.

ME 25.2

Which is the advantage of rolling bearings as compared with sliding bearings?

A. Rolling bearings run especially quiet.
B. Rolling bearings are not sensitive to schocks.
C. Rolling bearings require only minor maintenance.
D. Rolling bearings are not sensitive to dirt.
E. Rolling bearings are especially easy to readjust.

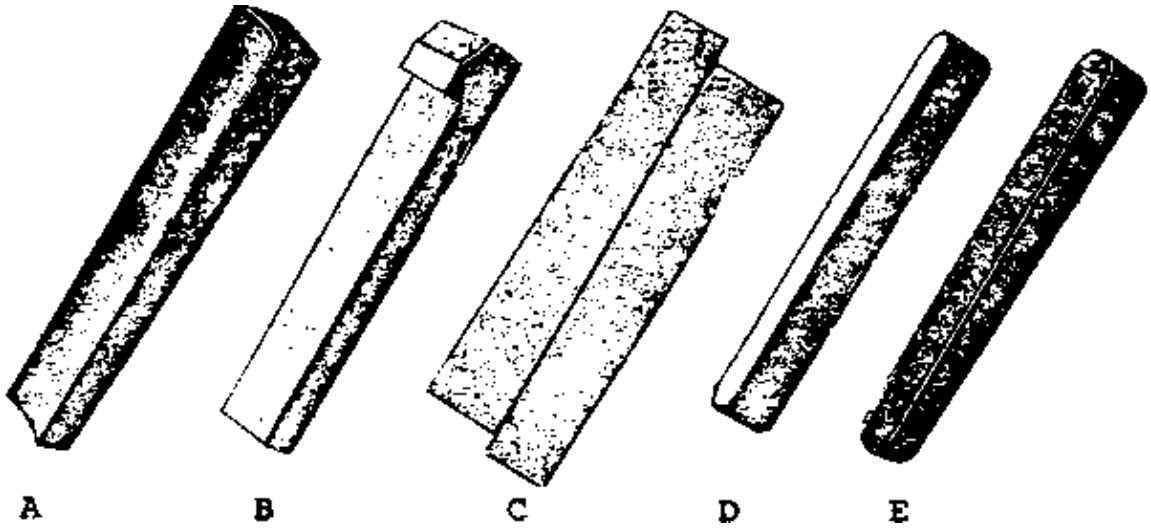
ME 25.3

Can a sliding bearing that has been designed for grease–lubrication be run with oil as a lubricant?

A. Yes, but only at low numbers of revolutions.
B. Yes, but very light oils have to be used.
C. No, the bearing would be damaged.
D. Yes, if the oil is used frequently.
E. Yes, oil can be used instead without any problems.

ME 25.4

For which of these machine elements is a keyway in the shaft not necessary?



ME 26.1

Which of the pictures shows a bearing that cannot be separated for mounting purposes?

Figure A

Figure B

Figure C

Figure D

Figure E

BRAZING AND WELDING

BW 1.1

Which of the materials given below is used for soldering irons, heating coils and electrical wiring?

A. steel
B. copper
C. stainless steel
D. brass
E. nickel

BW 1.2

For a spotwelding machine two specially shaped electrodes have to be manufactured. Which of the following materials is most suitable for this purpose?

A. aluminium
B. tool steel
C. cast iron
D. copper
E. mild steel

BW 1.3

What is the 'working temperature' in brazing operations?

A. The melting temperature of the brazing solder.
B. The temperature of the surface of the workpiece which makes the solder flow.
C. The temperature which causes the flux to evaporate.
D. The temperature at which the solder becomes solid.
E. The temperature of the workpiece at which the flux dissolves the oxide film.

BW 1.4

What is the purpose of tinning a workpiece before soldering?

A. Production of a bright surface.
B. Preparation for soldering and protection against corrosion.
C. To lower the melting point of workpieces to be soldered.
D. To achieve a high surface quality.

BW 1.5

Why is soldering of aluminium parts usually very difficult?

A. Because the working temperature has to be extremely high.
B. Because aluminium must not be brought into contact with fluxes.
C. Because the melting point of aluminium is lower than that of the solders.
D. Because it is very difficult to remove the oxide layer.

BW 2.1

Which is the main characteristic of brazing in comparison with soldering?

A. Copper is used as a solder.
B. The working temperature is higher than 450°C.
C. An open flame is used.
D. the tightness of the joint is important.
E. The materials to be joined are hard.

BW 2.2

Which of the following materials is not used as a flux for soldering or brazing?

A. Soldering fluid.
B. Borax.
C. Diluted hydrochloric acid.
D. Solution of copper sulphate.
E. Rosin.

BW 2.3

What is the purpose of using a flux for brazing?

A. To lower the working temperature of the solder.
B. To reduce the energy consumption.
C. To improve the flow of heat.
D. To reduce the consumption of solder.
E. To dissolve the oxide film and to avoid forming new oxide films during the brazing procedure.

BW 2.4

Which of the following is a brazing solder?

A. Pure tin solder.
B. Tin–lead solder.
C. Lead–nickel solder.
D. Pure lead solder.
E. Brass solder.

BW 2.5

Which is the characteristic colour of an oxygen cylinder?

A. Blue
B. Black
C. Yellow
D. Green
E. Red

BW 3.1

The main difference between brazing and soldering is the working temperature. Up to which temperature do we term the process soldering?

A. 630°C
B. 450°C

C. 330°C
D. 250°C
E. 182°C

BW 3.2

A piece of angle iron has to be fixed to a zinc plate. The worker intends to join the two parts by brazing. What would be your advice?

A. You have to use copper solder.
B. The zinc plate cannot be brazed.
C. Use borax as flux.
D. Use a brass solder.
E. Before starting with the brazing operation the zinc plate has to be cleaned mechanically.

BW 3.3

Which of the following is not necessary to prepare a workpiece in order to achieve a well soldered joint?

A. Metallic clean surfaces.
B. The highest possible surface quality.
C. Application of a flux.
D. Securing of two parts in position.
E. Heating up of the parts to be soldered.

BW 3.4

Why are soldering irons made of copper?

A. Because this metal reduces the working temperature of the solder.
B. Because copper has the necessary high toughness.
C. Because copper is a good conductor of heat.
D. Because copper is antimagnetic. Thus the solder flows better.
E. Because other materials cannot be tinned.

BW 3.5

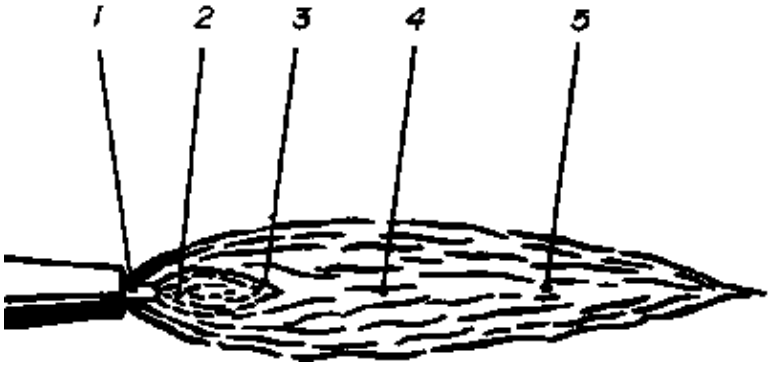
What is the correct name for this welded joint?

A. Face joint
B. Lap joint
C. Butt joint
D. Flanged joint

BW 4.1

Which number marks the point where the oxyacetylene flame reaches its highest temperature?

A. 1
B. 2
C. 3
D. 4
E. 5



BW 4.2

What is the correct name for this welded joint?

A. Parallel joint
B. Corner joint
C. Lap joint
D. Butt joint
E. Face joint

BW 4.3

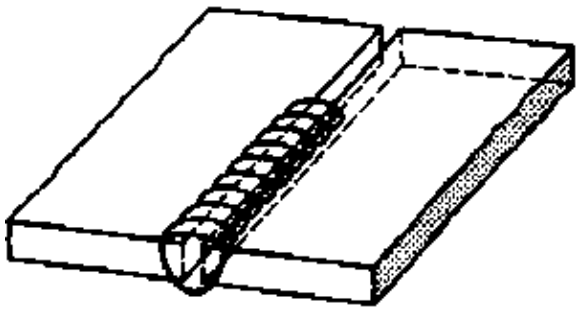
Which is an important advantage of riveting as compared with welding?

A. Saving of weight
B. Saving of time
C. Saving of material
D. Little distortion

BW 4.4

What is the correct name for this welding seam?

A. Face joint
B. U–weld
C. Square butt weld
D. Edge weld



BW 4.5

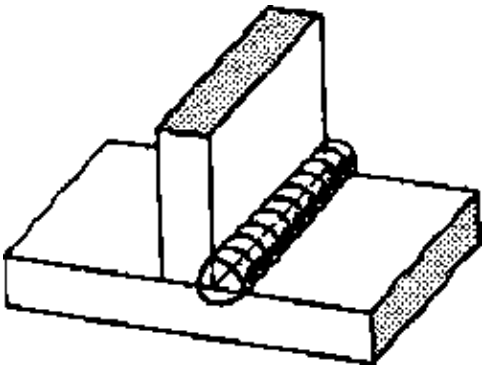
Why are fluxes used for welding non–ferrous metals?

A. To keep oxides and impurities away from the weld.
B. To improve the flow of gas inside the welding torch.
C. To lower the melting points of the materials to be welded.
D. They add oxygen to the molten material.

BW 5.1

What is the correct name for this welding seam?

A. Vee−weld
B. Corner weld
C. Butt weld
D. Fillet weld



BW 5.2

What is the correct name for this welded joint?

A. Cross joint
B. Butt weld
C. Corner joint
D. Angular joint
E. Vee−joint

BW 5.3

Which gas must <u>not</u> be brought in contact with oil or grease?

A. Nitrogen gas
B. Acetylen gas
C. Hydrogen gas
D. Oxygen gas
E. Carbonic gas

BW 5.4

Flux used for soldering brass is

A. tallow.
B. zinc chloride.
C. cast iron.
D. resin.

BW 5.5

In a lap joint the pieces are placed

A. perpendicular to each other.
B. on each other.
C. in front of each other.
D. at an angle to each other.

BW 5.6

Soldering irons are made of

A. steel.
B. zinc chloride.
C. aluminium chloride.
D. resin.
E. copper.

BW 6.1

What is the correct name for this welded joint?

A. Butt joint
B. Corner joint
C. Angular joint.
D. Cross joint.
E. T – joint.

BW 6.2

Select the solder which requires the lowest working temperature.

A. Brass solder.
B. Silver solder.
C. Copper solder.
D. Tin–lead solder.

BW 6.3

A carburizing flame

A. produces sooty smoke.
B. oxidizes the welding seam or causes oxide inclusions inside the seam.
C. decreases the carbon content of the seam.
D. can soften the seam and increase ductility.

BW 6.4

The correct current for welding mild steel with an electrode of 4 mm diameter is

A. 80 amps.
B. 110 amps.
C. 150 amps.
D. 220 amps.

BW 6.5

Which statement is correct?

A. The highest flame temperature for gas–welding is 2500 °C.
B. A gas mixture of air and acetylene produces the highest temperature.
C. A gas mixture of oxygen and acetylene produces the highest temperature.
D. The highest temperature of the flame is at a distance of 10 mm from the nozzle.

BW 6.6

Oxygen cylinders can be recognized by their

A. red colour.
B. right–hand thread.
C. maximal pressure of 150 N/cm^2 (220 lb/in^2).
D. red rubber hose leading to the blowpipe.

BW 7.1

Select the alloy used as soft solder.

A. Copper–zinc alloy.
B. Copper–tin alloy.
C. Tin–lead alloy.
D. Tin–zinc alloy.

BW 7.2

The temperature of the gas flame is highest at the end of inner white cone because

A. the gas flow is fastest there.
B. the nozzle heats up rapidly.
C. the flame burns with pure oxygen there.
D. the top of the flame cools down when touching the metallic surface.

BW 7.3

The gas regulator

A. supplies oxygen and acetylen gases at equal pressures.
B. supplies the required pressure for the operation independent of the cylinder content.
C. increases the pressure of gasses independent of the contents of the cylinder.
D. can only be set when the blowpipe (torch) valve is closed.

BW 7.4

The welding current does <u>not</u> depend on

A. the welding position.
B. the thickness of the electrodes.
C. the length of the electrodes.
D. the thickness of the sheets.

BW 7.5

The principal function of the coating on the electrodes for arc–welding is

A. to flux (dissolve) away any impurities present on the surface being welded.
B. to keep the electrode clean and prevent it from rusting.
C. to prevent undercutting.
D. to exclude the harmful oxygen and nitrogen of the atmosphere from the welding area.

BW 8.1

When welding with direct current

A. the electrode is connected with negative pole for low penetration of the melt.
B. the same temperature occurs at both poles.
C. the temperature of the positive pole is higher.
D. a transformer is used.

BW 8.2

Brazing is used for connecting

A. copper and zinc sheets by using silver solder.
B. copper and steel sheets by applying silver electrodes and arc−welding.
C. sheets of copper or steel by adding spelter which has a higher melting point than the base metal.
D. sheets of copper or steel by adding spelter which has a lower melting point than the base metal.

BW 8.3

Which statement is correct?

A. Forehand−welding (from right to left) is mainly used for thin sheets.
B. Oxidizing flames are used for welding aluminium.
C. For copper welding a tip of small size is used.
D. A flame with excess oxygen increases the hardness of the seam.

BW 8.4

When finishing the job the valve for acetylene is closed first, because

A. the flame burning only with oxygen, is easier to put out.
B. backfire cannot happen as long as the oxygen blows strong enough.
C. the mixing process is interrupted and the flame burns less intensively.
D. the explosion sound is not so high.

BW 8.5

For brazing steel and brass together

A. spelter of all compositions can be used.
B. silver solder with a low melting temperature is suitable.
C. silver solder cannot give a strong connection.
D. copper can be used as a spelter.

BW 9.1

The coating of the electrodes for arc−welding causes

A. a reduction of the electric conductivity of the atmosphere around the arc.
B. improvement of the seam quality by means of alloys.
C. an inert−gas shielding atmosphere around the arc.
D. faster cooling of the seam after welding.

BW 9.2

Alloys are formed by the spelter and the base metal when brazing,

A. as soon as the surface of the base metal gets molten.
B. if the melting point of the filler rod is higher than 500 °C.
C. because of the dissolving effects of the fluxes.
D. through diffusion of spelter into the solid surfaces of the sheets.

BW 9.3

For fixing a cemented carbide tips

A. spelter with a low zinc content is applied.
B. silver solder would be best.
C. pure copper gives highest heat and shock resistance.
D. spelter with a high copper content prevents the tool from overheating.

BW 9.4

Which statement about brazing is incorrect?

A. The filler rod is heated.
B. The melting point of the spelter is lower than that of the base metal.
C. At the brazing temperature the base metal melts and mixes with the spelter.
D. At the brazing temperature the spelter melts and partly diffuses into the base metal which remains solid

BW 9.5

Cemented carbide tools are brazed with pure copper because

A. there is less oxidation and corrosion involved.
B. of the low melting temperature of copper.
C. the cutting temperature may go up to 900°C when rough cutting with that tool.
D. the connection must be hard and as brittle as the cemented carbide.

BW 10.1

Fluxes should

A. prevent oxidation and decrease the melting point of the spelter.
B. form an alloy with the base metal and build up a protective coating.
C. Prevent oxidation and dissolve oxides formed on the surface of the metals.
D. make heating of the surfaces of the base metal easier.

BW 10.2

For brazing, the gap between the sheets should be as narrow as possible in order to

A. reduce the capillary action.
B. increase the melting temperature of the new alloys.
C. increase the sucking effect of the gap and strength of joint.
D. make alloys between spelter and base metal possible.

HEAT TREATMENT

HT 1.1

Which of the given processes cannot result in an increased hardness in steel?

A. By using other metals as alloys.
B. Hammering.
C. Rolling.
D. Heating up to 600°C and slowly cooling down.
E. Nitriding.

HT 1.2

Under presence of ammonia–gas steel is heated up to 500–560°C. What is this type of heat treatment called?

A. Annealing
B. Nitriding
C. Case hardening
D. Hardening
E. Flame hardening

HT 1.3

In series production gears and shafts are often flame hardened. What is the result of this process?

A. The workpiece is equally hardened throughout.
B. A hard core and a tough surface.
C. A hard surface and a tough core.
D. Less danger of cracks because the workpieces are not quenched.

HT 1.4

Which medium is used for quenching unalloyed toolsteel after heating up to hardening temperature?

A. Fluid lead
B. Salt bath
C. A flow of compressed air.
D. Water
E. Kerosine oil

HT 1.5

Which procedure is suitable for reducing casting strains in cast−iron workpieces?

A. Annealing at 600°C and subsequently quenching in water.
B. Longtime (6 to 8 months) weathering in the open air.
C. Heating up to 1300°C in a neutral atmosphere.
D. Normalizing at 800°C and subsequently quenching in oil.
E. Slowly heating up to 200°C and subsequently quenching in water.

HT 2.1

Which of the elements given below is added to the surface of a workpiece during the case hardening process?

A. Nitrogen
B. Hydrogen
C. Carbon
D. Chromium
E. Oxygen

HT 2.2

What is the carbon contents of case hardenable steel?

A. From 0.2 to 0.6 %
B. From 0.1 to 0.2 %
C. From 0.4 to 0.6 %
D. From 0.05 to 0.4 %
E. From 0.6 to 1.5 %

HT 2.3

The hardening temperature for unalloyed steel with 0.9 % C is

A. higher than that for steel with 1.2 % C.
B. higher than that for steel with 0.6 % C.
C. lower than that for steel with 1 % C.
D. lower than that for steel with 0.6 % C.

HT 2.4

What is the reason for the fact that by flame−hardening only the surface of the workpiece is hardened?

A. The carbon content in the core of the workpiece is too low.
B. The hardening temperature is not achieved in the core.
C. The quenching does not happen fast enough.

D. Heating up happens too slowly.

HT 2.5

What is the purpose of tempering?

A. To increase the hardness.
B. To remove hardening stresses and to achieve the desired hardness.
C. To achieve a smoother surface.
D. To increase the tensile strength.
E. To improve resistance against corrosion.

HT 2.6

Steel with 0.9 % carbon has a structure which is called

A. cementite.
B. pearlite.
C. austenite.
D. ferrite.

HT 3.1

Which of the elements given below is added to the surface of a workpiece during the nitriding process?

A. Hydrogen
B. Oxygen
C. Carbon
D. Chlorine
E. Nitrogen

HT 3.2

If you want to harden a workpiece of C 15 it has to undergo a preparatory process. Which material is necessary for this procedure?

A. Carbon−powder
B. Ammonia gas
C. Water bath
D. Oil

HT 3.3

The thickness of the case−hardened surface layer depends on

A. the speed of the flame motion when tempering.
B. the time used for carburizing the surface inside the case.
C. the time required for heating and quenching the surface.
D. the tempering temperature after case−hardening.

HT 3.4

Which properties have carburized steels after the carburizing process?

A. High tensile strength.
B. Higher carbon contents at the surface.
C. High creep resistance.
D. High elasticity.
E. High resistance against corrosion.

HT 3.5

Heat treatment cannot result in

A. increased hardness of the workpiece.
B. a remarkable increase in the resistance against corrosion.
C. refining the structure of the work.
D. improving temperature limit for cutting tools when used at high cutting speed.

HT 4.1

Steel with increasing carbon content above 0.9 % shows comparatively

A. increasing hardness and slightly decreasing strength.
B. decreasing brittleness and hardness.
C. increasing pearlite and decreasing cementite content.
D. increasing ductility and hardness.

HT 4.2

If the cutting edge of a chisel soon becomes dull after each sharpening, it needs

A. grinding without getting blue at the cutting lip.
B. annealing and tempering first.
C. hardening and tempering.
D. grinding and tempering afterwards.

HT 4.3

When case–hardening, the increase in hardness is limited to the surface, because

A. heating up is done slowly followed by fast quenching.
B. only the surface has the necessary carbon content.
C. the carbon diffuses into the surface and hardens without quenching.
D. only the surface is quenched.

HT 4.4

A suitable coolant for quenching unalloyed steel is

A. cold water.
B. very hot water.
C. salt water.
D. oil.

HT 4.5

Which rule for quenching is incorrect?

A. Warping and bending is caused by quenching of long work on one side over the whole length.
B. Blind holes should always open to the lower side.
C. Moving the work during quenching is advised.
D. Chisels are put into the coolant with the front part of the wedge only.

HT 5.1

A structural change in steel with 0.9 % C takes place at a temperature of slightly over

A. 600 °C
B. 700 °C
C. 800 °C
D. 900 °C

HT 5.2

The highest increase in hardness caused by quenching is found in steel with a carbon content of

A. 0.1 %
B. 0.4 %
C. 0.8 %
D. 1.2 %

HT 5.3

Which statement about case−hardening is incorrect?

A. The surface of mild steel is converted into high carbon steel.
B. Carbon penetrates into the solid surface by diffusion.
C. The depth of penetration of carbon is up to 20 mm.
D. The quenching process for case−hardening is the same as for high carbon steel.

HT 5.4

Tempering of a centre punch at too high a temperature will result in

A. the need to harden and temper the centre punch again.
B. repeated tempering at a lower temperature.
C. the need to normalize the work.
D. breakage at the top because of the high brittleness.

HT 5.5

Internal stresses of the steel caused by hardening are reduced by

A. heating up the work until it shows the correct tempering colour before finally quenching it.
B. hardening and tempering to a certain extent.
C. annealing and normalizing before hardening.
D. using salt water instead of oil for quenching the steel.

HT 5.6

Stress−free annealing of unalloyed steel is done

A. at a temperature of over 721 °C for a short time.
B. at about 550 °C for one to two hours.
C. at about 650 °C for one to two days.
D. at 1100 °C for a very short time only.

HT 6.1

The hardness and brittleness resulting from hardening and subsequent tempering is the more, the

A. slower quenching takes place.
B. lower the carbon content is.
C. higher the hardening temperature is.
D. lower the tempering temperature is.

HT 6.2

Which statement about tempering is incorrect?

A. The temperature for tempering is judged by the colour of the oxide film on a clean surface.
B. Tempering makes the steel very tough.
C. Tempering makes the steel harder.
D. Tempering reduces the hardness of steel.

HT 6.3

The wedge of a chisel will break, if

A. the chisel was heated up too slowly.
B. the chisel was quenched too slowly.
C. if it is not tempered after hardening.
D. the chisel was not moved in the coolant when quenched.

HT 6.4

The normalizing of steel is carried out to

A. achieve a particularly soft core of the workpiece.
B. make fine structure coarser.
C. give a hardened workpiece its original structure.
D. reduce welding stresses

HT 6.5

The increase in hardness is caused by

A. the contraction due to quenching.
B. the carbon atoms getting stuck in the iron molecules.
C. higher carbon content after hardening.
D. higher internal stress when quenched without tempering afterwards.

THREADS

Thr 1.1

The thread “M 10 × 1.25” is a fine thread. This type of thread is used

A. when the normal thread profile would be a hindrance.
B. when great forces have to be transmitted.
C. when a thread with a great pitch is required.
D. when an easy loosening of the screw has to be prevented.

Thr 1.2

A thread “M 5” is to be cut into a workpiece made of mild steel. Select the most suitable drill dia for the core hole.

A. 3.6 mm
B. 3.8 mm
C. 4.2 mm
D. 4.4 mm
E. 4.5 mm

Thr 1.3

A tap is broken. Which statement about the cause is wrong?

A. The diameter of the drill was too small.
B. The pitch of the tap was too great.
C. A lubricant was not used.
D. The tap was not aligned with the hole.

Thr 1.4

What is the advantage of a slotted threading die?

A. It is very suitable for threading of soft material.
B. The pitch of the thread can be changed if required.
C. A lubricant is not required.
D. The diameter of the threading die can be varied slightly.

Thr 1.5

While cutting a thread with a tap, the tap has to be turned back from time to time. Why?

A. To break the chips in order to prevent them from sticking in the flutes of the tap.
B. To achieve proper alignment of tap and hole.
C. To get long chips which come out of the hole easily.
D. Turning back is necessary only when no lubricant is used.

Thr 1.6

For spindles of moving parts usually

A. Metric V–threads are used.
B. Whitworth V–threads are used.
C. Acme threads are used.
D. British Standard Fine (BSF) threads are used.

Thr 2.1

The axial movement per rotation of a screw with a double start thread will be

A. the same as that of a single start screw with the same pitch.
B. twice as big as that of a single start screw with the same pitch.
C. half as big as that of a single start screw with the same pitch.
D. bigger because of its bigger pitch

Thr 2.2

A Withworth–thread can be identified by its

A. angle of 60°.
B. nominal diameter given in millimeter.
C. pitch given as a fraction of an inch.
D. very fine pitch for all single–start threads.

Thr 2.3

Which statement is incorrect?

A. Fine threads have a better self–locking effect.
B. Pitch of thread depends upon the diameter of the bolt.
C. Double–start threads have bigger lead as compared to single start threads.
D. A V–thread causes less friction than an acme–thread.

Thr 2.4

Which statement is incorrect?

A. For tapping metric thread “M 10” in mild steel the diameter of the drill is 8.5 mm.
B. A metric thread M 10 has bigger pitch than a metric fine thread M 10.
C. If the diameter of the hole to be tapped is too big, the tap will run out of centre.
D. The hole diameter for tapping internal thread in brittle materials should be smaller than ductile materials.

Thr 2.5

Multi–start threads are used

A. when alternating loads have to be transmitted.
B. to achieve a small amount of friction at the flanks of the thread.
C. to achieve a great axial movement with a small rotary motion.
D. to achieve a small axial movement with a great rotary motion.

Thr 3.1

The diameter of the core hole is drilled

A. bigger than the thread core diameter to avoid lubrication when cutting.
B. smaller than the thread core diameter to allow better guidance of the tap.
C. bigger than the thread core diameter because it gets smaller when tapped.
D. smaller than the thread core diameter because ductile metals squeeze out.

Thr 3.2

During thread cutting the tap can break

A. if cutting oil reduces the friction too much.
B. if the feed is too big.
C. if the drill is too big for the core hole.
D. if the tap bends due to unequal pressure of the tap wrench.

Thr 3.3

What does the expression “M 22 × 2” mean?

A. Metric thread 22 mm outside diameter, quality grade 2.
B. Metric thread 22 ∅, two starts.
C. Metric thread 22 mm outside dia, depth of thread 2 m.
D. Metric thread 22 mm outside dia, pitch 2 mm.

Thr 3.4

Which statement gives correct information about knuckle threads?

A. Knuckle threads are normally used for screws with an outside dia of less than 1 mm.
B. Screw joints with knuckle threads are difficult to loosen.
C. Knuckle threads are not very sensitive to dirt and damage.
D. The pitch of knuckle threads is always given in mm.
E. Knuckle threads are preferred as motion threads.

Thr 3.5

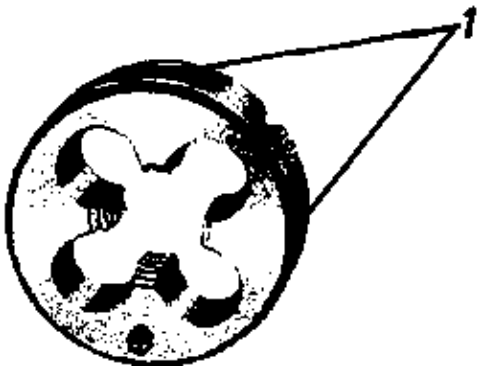
Which statement gives correct information about acme threads?

A. Acme threads are mainly used for fixing purposes.
B. Acme threads are mainly used at spindles where there is a great axial pressure from one side.
C. The pitch of acme threads is always given in inches.
D. Acme threads are usually used as motion threads.

Thr 4.1

What is the purpose of the two holes marked with '1'?

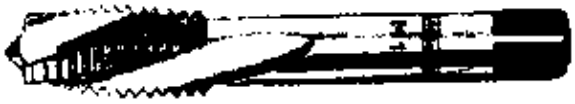
A. They allow for the supply of coolant.
B. They allow for a proper clamping of the die in the stock.
C. They make an adjustment of the die possible.
D. They indicate that this is the second of three dies of a set.
E. They indicate the direction of the thread (right or left hand).



Thr 4.2

Why is this tap not suitable for cutting threads in blind holes on a machine?

A. Because the helical flutes press the chips into the blind hole.
B. Because this tap has a long chamfer.
C. Because the helix angle is too big.
D. Because the chamfer is too short.



Thr 4.3

In a technical drawing a thread is dimensioned as 'M 20 × 2' What does the letter M mean?

A. Class of tolerance: medium
B. Metric thread
C. Thread for machine construction
D. Multiple thread (2 starts)

Thr 4.4

Buttress threads are mainly used for

A. spindles which are stressed in one axial direction only.
B. highly stressed screw joints in precision engineering.
C. screw joints which are subject to the influence of dust and dirt.
D. wood and self tapping screws.
E. screws with a pitch of less than 0.25 mm.

Thr 5.1

In a technical drawing a thread is represented with M 16 × 2. What does the figure '2' indicate?

A. The thread has 2 starts.
B. The thread has to be manufactured according to the requirements of quality grade '2'.
C. The pitch of the thread is 2 mm.
D. The start of the thread has to be given a chamfer of 2 mm width.

Thr 5.2

Which of the following threads has to be used to cause a great axial motion from the minor rotary motion of a spindle?

A. A single start Whitworth Thread.
B. A single start Fine Thread.
C. A single start Knuckle Thread.

D. A multiple start Acme Thread.
E. A single start Buttress Thread.

Thr 5.3

Which feature distinguishes a fine thread from a normal thread?

A. A higher quality of the surface.
B. A higher precision in the production.
C. A smaller pitch.
D. The direction of the pitch.
E. The shape of the thread.

Thr 5.4

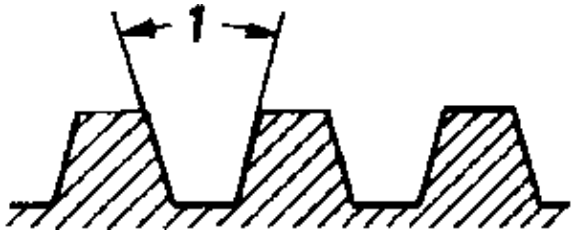
Which of the following threads is most suitable for preventing a screw from self−loosening?

A. Knuckle thread.
B. Acme thread.
C. Metric fine thread.
D. Buttress thread.
E. Metric thread.

Thr 5.5

Which is the size of the angle marked with '1' in the case of metric acme threads?

A. 22.5 °
B. 30 °
C. 33 °
D. 45 °
E. 47.5 °



Thr 6.1

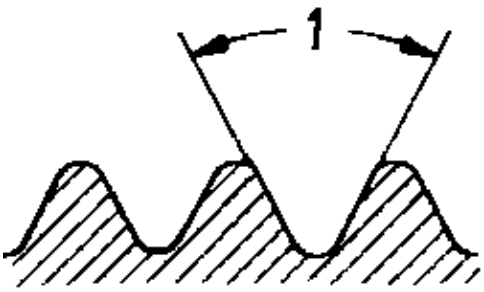
Which is the easiest way to find out whether a given thread is a single start thread or a multy start thread?

A. To check the pitch of the thread.
B. To check the thread angle.
C. To count the starts of the thread.
D. To check the shape of the thread.

Thr 6.2

Which is the correct expression for the angle marked with '1'?

A. Top angle
B. Thread angle
C. Pitch angle
D. Screw angle
E. Cutting angle



Thr 6.3

Which of the following is the particular advantage of the adjustable ring die shown in the picture?

A. It is especially suitable for soft material (because of the elasticity of the ring).
B. It guarantees a correct guidance, thus avoiding untrue threads.
C. It is always used for pipe threads because these threads have to be produced in several cuts.
D. It allows certain expansion of the threading die.

Thr 6.4

The flutes of a tap are provided for the purpose of

A. Balancing the weight of the tool.
B. Permitting depth measurements.
C. Providing the cutting edges.
D. Measuring the core diameter.

Thr 7.1

The most commonly used type of machinists tap wrench is the

A. Solid–jaw tap wrench.
B. Variable–jaw tap wrench.
C. Adjustable tap wrench.
D. Spring tap wrench.

Thr 7.2

The most efficient way to check a tapped hole is to use

A. A comparator.
B. A ring guage.
C. A plug–thread gauge.
D. The three wire method.

Thr 7.3

The core hole diameter is always larger than the core diameter of the tap because

A. During tapping the material is pressed towards the crest of the thread and core hole gets smaller.
B. The crests must not be sharp.
C. This increases the service life of the tap.
D. Otherwise the internal thread cannot be checked for dimensional accuracy.

TURNING

T 1.1

Which part belongs to the headstock of a lathe?

A. Main spindle
B. Tool post
C. Tailstock
D. Carriage
E. Cross slide
F. Compound slide

T 1.2

Taper turning with the compound slide has the disadvantage

A. of only being useful for long slender tapers.
B. that it must be done with manual feed.
C. that no internal taper at hollow parts can be turned.
D. that the tool cannot be reset during one turning operation.

T 1.3

A mandrel is used

A. in a chuck for moving jaws.
B. for taper turning only.
C. for holding the dead centre only
D. for turning bored workpiece over the whole length.

T 1.4

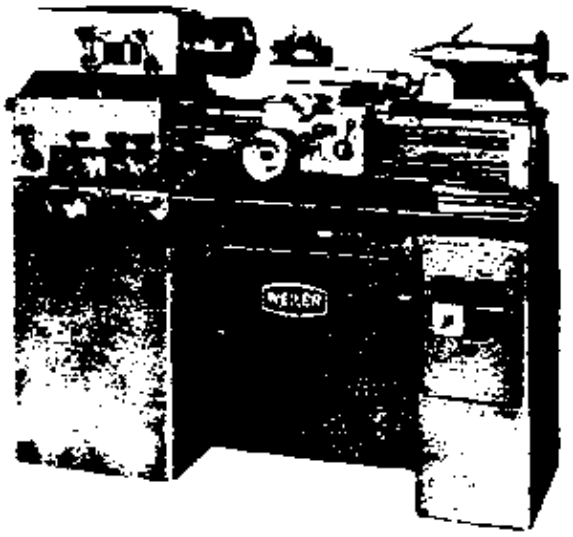
Which of the following parts carries out the main motion when turning?

A. Lathe tool
B. Tool slide
C. Workpiece
D. Feed shaft
E. Lead screw

T 1.5

What is the correct name for this lathe machine?

A. Bench lathe
B. Semi automatic lathe
C. Centre lathe
D. Facing lathe
E. Turret lathe



T 2.1

A workpiece being roughly forged round and hollow should be clamped

A. on the three–jaw chuck.
B. on a mandrel.
C. between the centres.
D. on the four–jaw chuck.

T 2.2

Workpieces with reamed holes can be turned over the whole length without reclamping when fixed

A. in a four–jaw chuck.
B. on a mandrel.
C. opposite a moveable steady.
D. between the centres and driven by a carrier.

T 2.3

A job is centre drilled on the lathe with a centre drill. Which of the following statements is correct?

A. We set the machine for a high number of revolutions and feed very carefully.
B. We set the machine for a low number of revolutions and feed very carefully.
C. We set the machine for a high number of revolutions and feed very fast.
D. We set the machine for a low number of revolutions and feed very fast.

T 2.4

Which of the following parts carries out the feed motion during longitudinal turning?

A. Workpiece
B. Tailstock
C. Cross slide
D. Lathe tool
E. Main spindle

T 2.5

Which statement is incorrect?

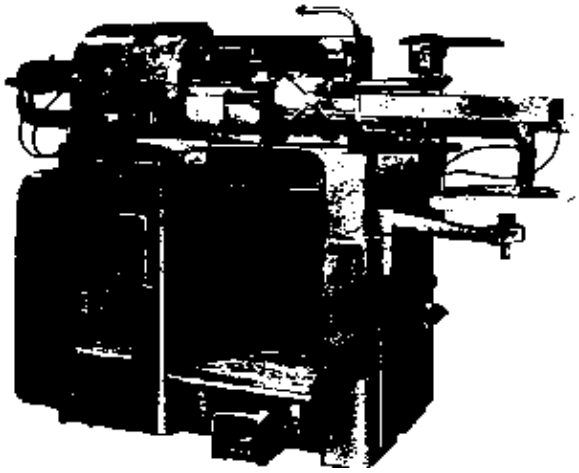
A. The moveable steady is fixed on the carriage.
B. Moveable steadies support the workpiece opposite the tool.
C. Steadies prevent short and thick workpieces from bending during the turning operation.

D. Steadies are used for the facing of long slender workpieces.

T 3.1

What is the correct name for this lathe machine?

A. Turret lathe
B. Automatic lathe
C. Capstan lathe
D. Copying lathe
E. Vertical turret lathe



T 3.2

Which of the following machine tools is very frequently used in the production of single parts because of its wide range of application?

A. Centre lathe
B. Bench lathe
C. Vertical turret lathe
D. Facing lathe
E. Turret lathe

T 3.3

Which of the following machine tools has a horizontal face plate?

A. Facing lathe
B. Automatic lathe
C. Bench lathe
D. Turret lathe
E. Vertical turret lathe

T 3.4

If the cutting edge of the turning cutter is set above centre

A. it should be useful for finishing soft material.
B. the clearance angle is increased.
C. the chip removal of tools with small wedge angles (lip angles) is improved.
D. the actual rake angle is increased.

T 3.5

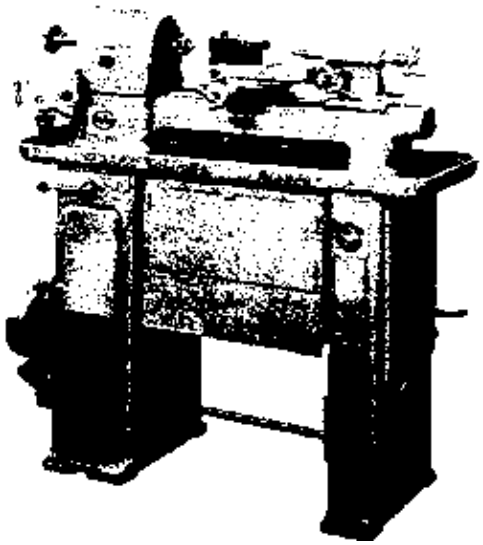
Which is the most sensitive part of a lathe tool?

A. Secondary cutting edge
B. Main cutting edge
D. Clearance face
E. Tool point

T 4.1

What is the correct name for this lathe machine?

A. Woodworking lathe
B. Facing lathe
C. Bench lathe
D. Centre lathe
E. Turret lathe



T 4.2

Automatic lathes are used

A. for single piece production of simple workpieces.
B. for machining big machine parts.
C. for machining big workpieces of hard metal.
D. for mass production.
E. for single piece production of highly accurate work–pieces.

T 4.3

Centre lathes are mainly used if

A. large numbers of simple workpieces have to be produced.
B. simple, cast workpieces have to be machined by semiskilled workers.
C. several tools are to be operated at the same time.
D. in single piece production various turning operations have to be carried out on one workpiece.

T 4.4

Which statement about turning is incorrect?

A. Running against an obstacle the power feed is stopped by dropping the worm.
B. The drop worm stops the feed shaft.
C. The lead screw is used for cutting threads (spindles).
D. The gear box for the power feed is driven by the main spindle.

T 5.1

What is the correct name for this lathe machine?

A. Multi−spindle automatic lathe
B. Centre lathe
C. Copying lathe
D. Turret lathe
E. Single−spindle automatic lathe

T 5.2

Which statement is incorrect?

A. Headstock and tailstock are parts of the lathe.
B. The lead screw and the feed shaft are locked against each other.
C. Driving plate and dog carrier operate together when turning between centres.
D. Expansion of work during machining can be overcome by tightening the work between the centres as firmly as possible.

T 5.3

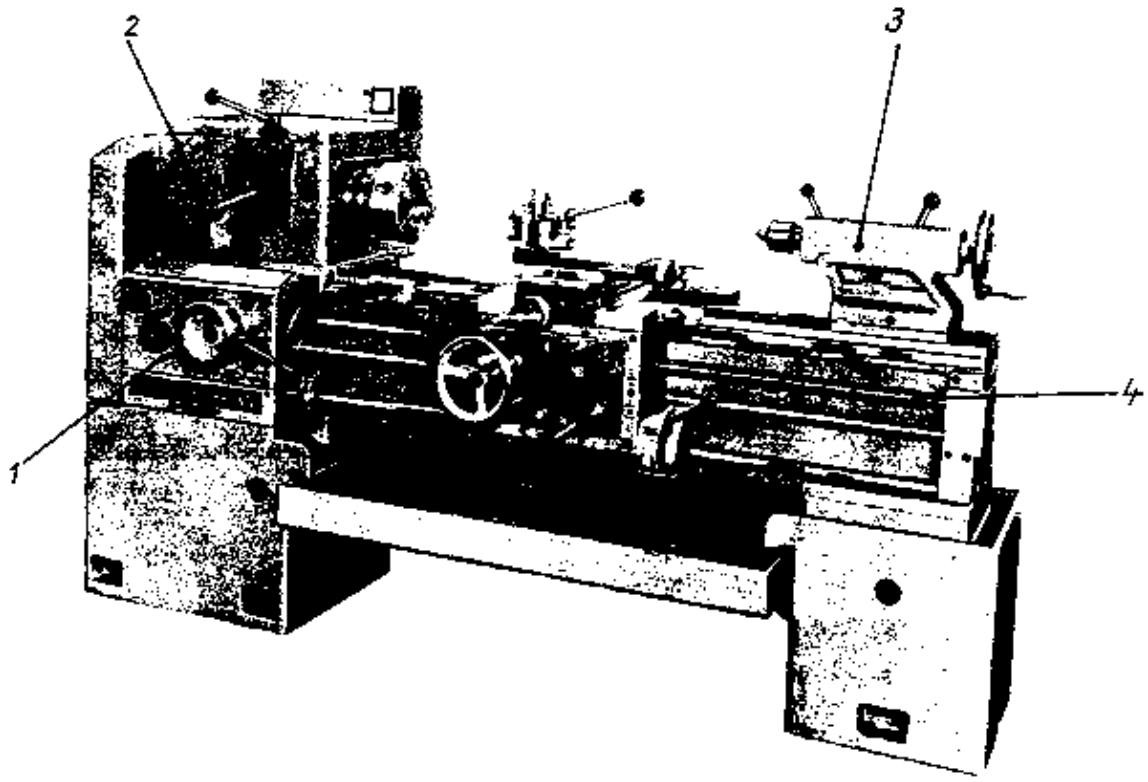
The lead screw of the centre lathe serves for

A. cutting threads.
B. facing hollow workpieces (internal facing) with power feed.
C. taper turning.
D. turning long works with power feed.

T 5.4

The jaws of the face plate

A. are moved synchronously with one key.
B. have acme threaded spindles and move independent of each other.
C. can be moved only in one direction for fixing the work.
D. are chosen according to the diameter of the workpiece.



T 6.1

What is the correct name for the part marked with '1'?

A. Apron box
B. Feed gear box
C. Head stock
D. Change gear drive
E. Tail stock

T 6.2

What is the correct name for the part marked with '2'?

A. Main gear box
B. Head stock
C. Apron box
D. Wheel box
E. Spindle box

T 6.3

What is the correct name for the part marked with '3'?

A. Head stock
B. Outer support
C. Tail spindle
D. Steady rest
E. Tail stock

T 6.4

What is the correct name for the part marked with '4'?

A. Lead screw
B. Acme screw shaft

C. Control shaft
D. Feed shaft
E. Tie rod

T 7.1

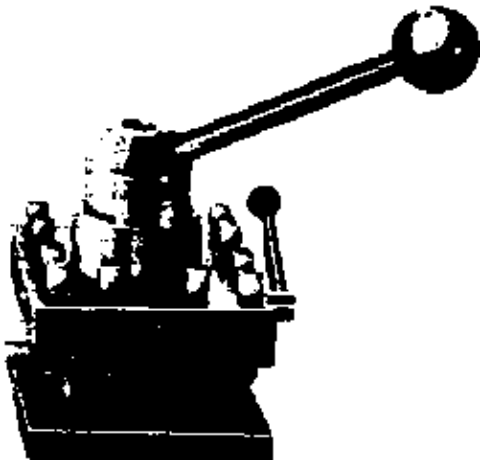
What is the correct name for this machine part?

A. Universal chuck
B. Round table
C. Driving plate
D. Clamping plate
E. Face plate

T 7.2

On which part of the lathe is this part fixed?

A. Saddle
B. Apron box
C. Compound slide
D. Lathe bed
E. Cross slide



T 7.3

Reclamping of the workpiece mostly results in running out of centre when

A. fixed on a mandrel.
B. rechucked in a three–jaw chuck.
C. fixed between centres, headstock and tailstock being centred accurately.
D. collets are used.

T 7.4

The working range of the lathe cannot be stated by

A. the length between centres.
B. the height of the centres above the guideways.
C. the range of numbers of revolutions.
D. the total overall length of the lathe.

T 7.5

The headstock houses

A the main spindle and the main gear box.
B. the power feed gears and the feed shaft.
C. the sleeve with taper for holding drills and the dead centre.
D. the lead screw with supporting bearing.

T 7.6

A right hand side tool is very suitable for

A. longitudinal roughing.
B. facing.
C. parting.
D. threading.

T 8.1

What statement about an independent four–jaw chuck is correct?

A. It is not to be used for round jobs.
B. The jaws move simultaneously.
C. The jaws can be used in reversed position.
D. The jaws cannot be moved in reversed position.

T 8.2

A long workpiece can be clamped between centres or clamped in the universal, chuck and supported by the dead centre. What is an important advantage of clamping between centres?

A. The job will never get tapered.
B. The job will run true after reclamping.
C. Setting of the lathe is easier.
D. A higher cutting speed can be applied.

T 8.3

A workpiece is to be clamped between centres. Select the most suitable combination.

A. Revolving centre in the main spindle and dead centre in the tailstock.
B. Revolving centre in the main spindle and revolving centre in the tailstock.
C. A centre in the main spindle and a centre in the tail–stock.
D. A centre in the main spindle and a revolving centre in the tailstock.

T 8.4

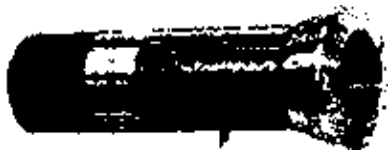
What is the correct name for this machine part?

A. Follow steady
B. Centering fork
C. Steady rest
D. Thread chaser
E. Polishing stock

T 9.1

What is the correct name for this part?

A. Lathe mandrel
B. Expanding mandrel
C. Clamping sleeve
D. Collet chuck
E. Drilling chuck



T 9.2

Which of the following angles are changed in their effective size if a lathe tool is set above or below centre?

A. Rake angle and clearance angle
B. Wedge angle and clearance angle
C. Wedge angle and rake angle
D. Cutting angle and wedge angle
E. Nose angle and plan angle

T 9.3

How is a lathe tool correctly set?

A. About 1 mm above centre.
B. Exactly on centre.
C. About 2 % of the workpiece dia above centre.
D. About 1 mm below centre.

T 9.4

Which of the following instruments is suitable for a quick and proper checking of the angles on a lathe tool?

A. Measuring magnifier
B. Grinding gauge
C. Bevel protractor
D. Bevel

E. Bevelled edge square

T 9.5

What is the correct unit of the cutting speed for turning operations?

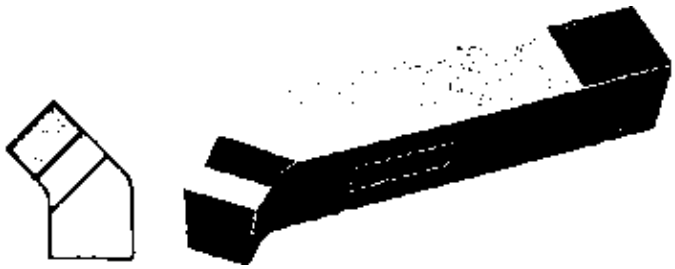
A. m/min
B. mm/Rev.
C. mm/min
D. mm/sec.
E. m/sec.

T 9.6

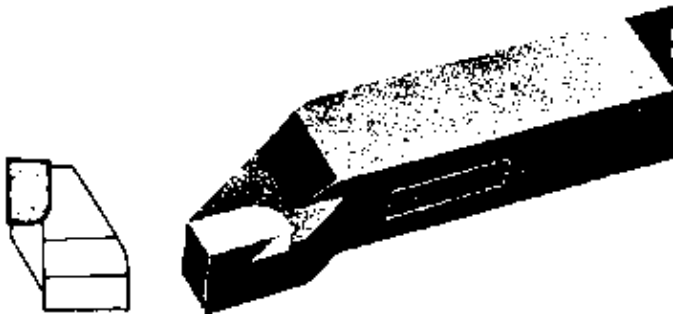
Select the operation which cannot be done on a lathe.

A. Making a flat surface.
B. Drilling.
C. Reaming.
D. Making a Tee–slot.

Picture a



Picture b



Picture c

Picture d

Picture e

T 10.1

Which of the pictures shows a straight right hand roughing tool?

A. picture a
B. picture b
C. picture c
D. picture d
E. picture e

T 10.2

Which of the pictures shows a parting tool?

A. picture a
B. picture b
C. picture c
D. picture d
E. picture e

T 10.3

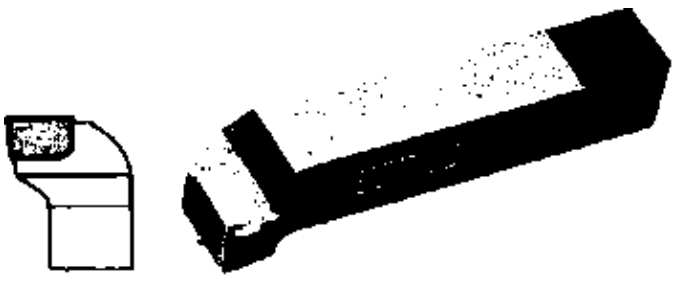
Which of the pictures shows a offset right hand side tool?

A. picture a
B. picture b
C. picture c
D. picture d
E. none

T 11.1

For which of the following operations is this tool used?

A. Facing from centre outward.
B. Longitudinal turning.
C. Longitudinal roughing.
D. Longitudinal finishing.
E. Facing from outside to the centre.



T 11.2

What is meant by 'service life' of a lathe tool?

A. The working time of a lathe tool between grinding and regrinding.
B. The time which a tool needs to be heated up to 500°C during the turning operation.
C. The time between the first and the second grinding operation.
D. The time which a lathe tool needs to cool down to 20°C.
E. The duration of time between the first grinding of a lathe tool and when it has to be thrown away.

T 11.3

What is the correct unit of the feed for turning operations?

A. meter per second	m/sec.
B. meter per minute	m/min.
C. millimeter per revolution	mm/Rev.
D. meter per revolution	m/Rev.
E. millimeter per second	mm/sec.

T 11.4

Why should one avoid removing a job from the chuck before all possible cutting operations are finished?

A. Because the chuck will not run true afterwards.
B. Because the dead centre will not run true afterwards.
C. Because the surface of the job will be spoiled after reclamping.
D. Because the job will not run true after reclamping.

T 11.5

Which of the following is not a part of the lathe?

A. Bed
B. Tailstock
C. Table
D. Tool post

T 12.1

A square rod, 42 mm across flats, is to be clamped in the lathe. Select the most suitable clamping method!

A. Flying arbor.
B. Three–jaw universal chuck.
C. Four–jaw universal chuck.
D. Face plate.

T 12.2

When facing a workpiece on a lathe

A. a right hand tool is to be used.
B. a left hand tool is to be used.
C. a parting tool is to be used.
D. a carbide–tipped tool is to be used.

T 12.3

What can you say about the relationship between the cone angle and the setting angle for turning the cone?

A. Both are equal.
B. Cone angle = half the setting angle.
C. Setting angle = half the cone angle.

D. Setting angle = twice the cone angle.

T 12.4

A job is to be clamped between centres. What accessories are required?

A. Universal chuck, live centre, dog carrier.
B. Live centre, dead centre, dog carrier, steady rest.
C. Driving plate, universal chuck, dog carrier, live centre.
D. Dog carrier, live centre, dead centre, driving plate.

T 12.5

What type of workpieces can be clamped on a flying arbor?

A. Long workpieces of small diameter.
B. Discs with finished outside diameter.
C. Discs with centric hole.
D. Very heavy workpieces.

T 12.6

A left hand lathe tool

A. works from the right to the left.
B. works from the left to the right.
C. can be used for facing only.
D. can be used for longitudinal work only.

T 13.1

When facing on a lathe

A. the carriage moves.
B. the tailstock moves.
C. the cross slide moves.
D. the compound slide moves.

T 13.2

The carriage of a lathe

A. can be moved along the bed only.
B. can be swivelled.
C. can be moved crosswise.
D. carries the tailstock.

T 13.3

When turning a taper, the cutting edge of the lathe tool has to be set exactly on centre. Otherwise

A. the lathe machine does not run quietly.
B. the setting angle is decreased.
C. the taper ratio is correct.
D. the surface becomes rough.
E. the surface line becomes curved.

T 13.4

A steady rest is used primarily to support long workpieces when

A. performing internal turning operations.
B. thread cutting externally.
C. finishing last operation.
D. it is desirable to prevent warping.

T 13.5

When adjusting the steady rest it is advisable to tighten

A. the upper jaw first.
B. the lower jaws first.
C. all three jaws at once.
D. the binding nuts first.

T 14.1

A lathe tool has a very small clearance angle.

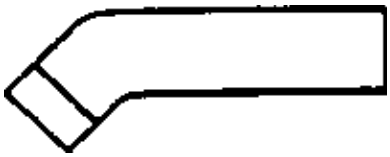
What will be the consequence of working with this tool?

A. The service life will be short.
B. Continuous chips will be produced
C. Discontinuous chips will be produced.
D. The surface will be very smooth.

T 14.2

The lathe tool shown in the sketch is a

A. bent right hand roughing tool.
B. straight left hand roughing tool.
C. bent left hand roughing tool.
D. straight finishing tool.



T 14.3

When the tool point of a lathe tool is set below centre

A. the rake angle will be increased.
B. the wedge angle will be decreased.
C. the rake angle will be decreased.
D. the clearance angle will be decreased.

T 14.4

Which statement about the headstock is correct?

A. The headstock is fixed on the carriage.
B. The bearings for the main spindle are fixed in the headstock.
C. The workpiece is fixed on the headstock.
D. The tool is fixed on the headstock.

T 14.5

A job is to be clamped in an independent chuck. The operator centers the job with the help of a dial indicator. The reading of the dial changes by 2.8 mm during one revolution. How much is the workpiece out of centre?

A. 1.4 mm
B. 5.6 mm
C. 0.7 mm
D. 2.8 mm

T 14.6

A job is clamped between centres. Where is lubrication required?

A. Between job and live centre.
B. Between job and dog carrier.
C. Between job and driving plate.
D. Between job and dead centre.

T 15.1

When the tool point of a lathe tool is set above centre,

A. the wedge angle will be increased.
B. the clearance angle will be increased.
C. the rake angle will be increased.
D. the tool angles are not effected.

T 15.2

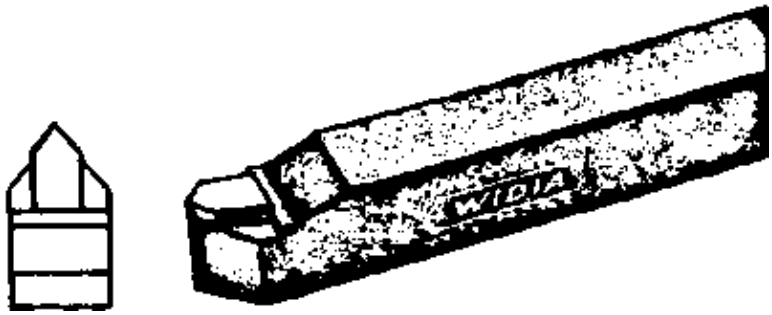
A V–pulley is to be turned. What precaution must be carefully observed?

A. The top rake of the lathe tool is to be exactly 14.
B. A bell type centre drill is to be used for centre drilling.
C. The diameter of the hole and the outer diameter have to run true.
D. The true running of the driving plate has to be checked before starting the work.

T 15.3

Which of the following operations is carried out with the tool shown in the picture?

A. Roughing of faces.
B. Cutting of external threads.
C. Finishing of surfaces in longitudinal direction.
D. Machining of recesses at threads.
E. Parting off of thin pipes.



T 15.4

A long shaft, clamped between centres, was turned along the whole length. The diameter of the end of the shaft nearest the tailstock was found to be smaller than the diameter nearest the live centre. What is to be done to get an exactly cylindrical job?

A. The live centre is to be ground because the mistake was caused by untrue running.
B. The tailstock is to be adjusted towards the operator.
C. The tailstock is to be adjusted away from the operator.

D. A follower rest is to be used.

T 16.1

A rectangular plate, 600 × 200 mm, thickness 200 mm, is to be clamped on the lathe in such a way, that the thickness can be reduced. Select the most suitable clamping method!

A. With a three−jaw universal chuck
B. With a face plate with angle plate
C. With a four−jaw independent chuck
D. With a four−jaw universal chuck

T 16.2

The cutting edge of a boring tool should be set

A. 0.5 mm above centre.
B. 0.5 mm below centre.
C. 1 mm above centre.
D. on centre.

T 16.3

Where is the follower rest fixed?

A. On the bed of the lathe
B. On the carriage
C. On the compound slide
D. On the cross slide

T 16.4

A disc with an outside diameter of 300 mm has a centric hole of 100 mm diameter. It is to be clamped on the lathe to turn the outside diameter.

Select the most suitable clamping method!

A. Three−jaw universal chuck with inside jaws
B. Four−jaw universal chuck with inside jaws.
C. Three−jaw independent chuck with inside jaws
D. Flying arbor

T 16.5

A job is clamped between centres but the driving plate does not run true. What will be the consequence?

A. The job gets tapered.
B. The job will not run true.
C. The dead centre will get spoiled.
D. The form of the job will not be affected.

T 17.1

A bar, ∅ 20 × 30, has a centric hole of 8 mm diameter. At one end the diameter is to be reduced to 12 mm diameter, on a length of 10 mm (square shoulder). True running of the inside and outside diameters is very important. How has the workpiece to be clamped?

A. In the three−jaw chuck
B. On an arbor between centres
C. On a mandrel between centres
D. In a draw−in collet chuck

T 17.2

Irregularly shaped workpieces can be clamped on the lathe with the help of an angle plate. Where do we fix this angle plate?

A. On the face plate
B. On the driving plate
C. On the bed of the lathe
D. On the universal chuck

T 17.3

In which case is the use of a mandrel for longitudinal turning on the lathe recommended?

A. When the job has a centre hole and is very long.
B. When the outer surface has to run true with the centric hole.
C. When the centric hole is to be reamed on the lathe.
D. When a taper is to be turned by off−setting the tailstock.

T 17.4

Find out which combination of clamping devices is not possible.

A. Flying arbor and dead centre.
B. Mandrel and dead centre.
C. Universal chuck and steady rest.
D. Collet chuck and follower rest.

T 17.5

A universal chuck does not run true. Which of the reasons given below is wrong?

A. A chip was clamped in between the shoulder of the main spindle and the centering face of the chuck.
B. The jaws were inserted into the slots in wrong sequence.
C. The dead centre was not properly aligned with the axis of the chuck.
D. There was a burr on the centering face of the main spindle.

T 18.1

In which case do we get continuous chips while turning mild steel?

A. When the tool has a small clearance angle.
B. When the tool has a big wedge angle.
C. When the tool has a big rake angle.
D. When the tool has a big nose angle.

T 18.2

Which of the following statements is not correct?

A. Turning tool is normally set on the centre height.
B. Lathe tools with a big wedge angle are sometimes set above centres to improve the flow of chips.
C. For roughing operations the lathe tool can be set below centre to improve the flow of chips.
D. For forming and parting off, the tool has to be set on centre height.

T 18.3

What happens if the main spindle and tailstock centre of a lathe machine are not properly aligned?

A. Although the workpiece runs in centre, it becomes conical.
B. The surface becomes rough.
C. The workpiece does not become circular.

D. At first the workpiece runs untrue, however, it becomes cylindrical after finishing.

T 18.4

An irregularly shaped workpiece is clamped on the face plate. A counter weight is used for balancing. Where do we fix the counter weight?

A. On the workpiece.
B. On the tailstock.
C. On the face plate.
D. Exactly in the live centre.

T 18.5

Which clamping method is most suitable for irregularly shaped jobs?

A. Driving plate
B. Universal chuck
C. Face plate
D. Collet chuck

T 18.6

For a turning operation a dog carrier is used. What other part is required?

A. A steady rest
B. A tumbler gear
C. A driving plate
D. A collet chuck

T 19.1

What is the purpose of the lead screw of a lathe machine?

A. To transmit the feed for longitudinal turning.
B. To cut threads (feed acc. to pitch).
C. To transmit feed for facing.
D. To turn tapered parts.

T 19.2

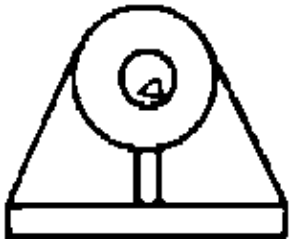
Which statement is correct concerning the setting of a thread cutting tool?

A. About 1 mm above centre height
B. Exactly on centre height
C. About 1 mm above the centre of the workpiece
D. About 2 % of the job dia above the centre
E. About 1 mm below centre height

T 19.3

What is the proper way of clamping the workpiece shown in the drawing?

A. On a face plate
B. In a three−jaw chuck
C. In a collet chuck
D. On a driving plate



T 19.4

What is the proper way of clamping short cylindrical parts with small diameters (e.g. 2 mm)?

A. With collet chucks
B. With an expanding mandrel
C. With a stepped chuck
D. With driving plates

T 19.5

Which parts belong to the headstock?

A. Change gears and bearing of the main spindle
B. Main spindle and main drive
C. Feed shaft and feed drive
D. Feed drive and drive motor

T 20.1

The direction of the automatic feed of a lathe machine can be changed

A. by opening or closing the half nuts at the apron box.
B. by using the lever for longitudinal and transverse motion.
C. by shifting the Norton–arm.
D. by means of the reversing gear.

T 20.2

Which of the following aspects is of no importance in choosing the angles at the lathe tool?

A. The hardness of the tool and the cutting speed
B. The hardness and brittleness of the workpiece
C. The dia and length of the workpiece
D. The service life of the tool and the surface quality of the workpiece

T 20.3

When a workpiece is clamped on a face plate in such a way that its centre of gravity is not on the centre axis of the lathe machine, then

A. an angle support has to be used for clamping.
B. a steady rest has to be used for clamping.
C. a counterweight has to be mounted for balancing.
D. the turning operation has to be carried out at a low number of revolutions to minimize the centrifugal force.

T 20.4

A lathe tool has a clearance angle of 7°. The wedge angle was found to be 70°. What is the size of the top rake?

A. 77°
B. 63°

C. 38.5°
D. 90°
E. 13°

T 20.5

A long shaft is to be centre drilled on the lathe. Select the most suitable combination of clamping devices.

A. Universal chuck and steady rest
B. Universal chuck and follower rest with two jaws
C. Universal chuck and dead centre
D. Driving plate, dog carrier, live centre, dead centre

T 21.1

The size of a lathe is specified by

A. length of bed.
B. diameter of the chuck.
C. maximum diameter of the workpiece which can be turned and the total length of bed.
D. horsepower of the motor.

T 21.2

You must always “switch off” your machine when you leave it for any reason because

A. some may accidently engage the feed lever.
B. the machine may speed up.
C. the tool may break.
D. the motor will over−heat.

T 21.3

It is dangerous to leave the “chuck−key” in the lathe chuck because it might cause

A. the chuck to loosen.
B. the chuck−key to get broken.
C. injury to yourself or somebody nearby.
D. bad surface finish of the job.

T 21.4

Knurling is performed to provide a surface that is

A. easy to grip.
B. resistant to wear.
C. decorative.
D. easy to finish in a hurry.

T 21.5

Proper knurling speed is

A. same as turning speed.
B. faster than turning speed.
C. as low as possible.
D. as high as possible.

T 22.1

Taper shanked tools are commonly used because they

A. are easy to prepare.
B. have a long service life.
C. can be held very securely.
D. are easy to install and align.

T 22.2

Boring is the process of enlarging a hole by means of a

A. drill.
B. counterbore.
C. single pointed tool.
D. countersink.

T 22.3

What method would you use to machine a short standard taper hole if the lathe is not equipped with a taper attachment?

A. Wide nosed tool
B. Boring tool
C. Taper reamer
D. Off−setting tail stock

T 22.4

What method is most commonly used to produce external tapers of small length?

A. Off−setting the tail stock
B. Taper attachment
C. Compound slide
D. Formed tool

T 22.5

While working on a lathe machine you should keep your sleeve rolled above your elbow to prevent

A. moving parts from catching the sleeve.
B. hot chips from clinging to your arm.
C. getting your sleeves dirty.
D. damaging the shirt.

T 22.6

You should wear goggles when machining certain types of materials that cause flying chips in order to

A. prevent a serious eye injury.
B. see the work better.
C. keep smoke out of your eyes.
D. be comfortable.

T 23.1

The screw thread micrometer is used for checking

A. outside diameter.
B. minor dia (core dia).
C. pitch diameter.
D. depth of thread.

T 23.2

A female thread gauge is used for checking

A. internal threads.
B. external threads.
C. only standard threads.
D. only special threads.

T 23.3

The number of thread per inch on the spindle of a micrometer according to inch system is

A. 40
B. 25
C. 50
D. 100

T 23.4

Screws having two or more starts are known as

A. National Standard threads.
B. special threads.
C. compound threads.
D. multistart threads.

T 23.5

The bench lathe is

A. used for polishing.
B. a small tool room lathe.
C. not capable of cutting thread.
D. used only for rough, inaccurate work.

T 23.6

The accuracy of a taper is commonly checked by means of

A. taper gauges.
B. gauge blocks.
C. indicator and height gauge.
D. V−blocks.

T 24.1

A thread pitch gauge is used to

A. check the pitch of thread.
B. check the point of threading tool.
C. measure the depth of thread.
D. check the pitch diameter.

T 24.2

When the tailstock is off−set towards the operator the small end of the taper will be

A. on the tailstock end of the work.
B. on the headstock end of the work.
C. same on both ends.
D. exactly in the centre.

T 24.3

Internal tapers formed by reaming arc started by

A. drilling the hole smaller than small diameter.
B. using a roughing taper reamer.
C. using taper attachment.
D. boring bar.

T 24.4

The taper attachment is not used when machining

A. internal tapers.
B. long external tapers.
C. with very large taper ratio.
D. with very small taper ratio.

T 24.5

The taper attachment permits tapers to be turned with

A. centres in line.
B. centres not in line.
C. one centre only.
D. off−set tailstock.

T 24.6

The cutting speed and feed for reaming are

A. lower than for drilling.
B. higher than for drilling.
C. exactly the same as for drilling.
D. may be selected higher or lower than for drilling.

T 25.1

A wide−nosed cutting tool is generally used for cutting tapers of

A. extreme accuracy.
B. greater length than attachment permits.
C. short length, when other methods are inconvenient.
D. when taper turning attachment is not available.

T 25.2

For mounting lathe chuck

A. start it by hand and then turn on the power.
B. mount it on by power.
C. mount it by hand.
D. mount it with the help of a hammer.

T 25.3

To prevent the chuck from damaging the lathe ways while mounting

A. lift the chuck with a hand crane.
B. ask the instructor or foreman for help.
C. place a wooden block or board on the ways.
D. wash your hands.

T 25.4

It is safe practice to measure a workpiece held between centres when it

A. has been stopped.
B. is revolving.
C. is taken out of centres.
D. is finished.

T 25.5

When you file in a lathe, it is safest to file

A. left handed.
B. right handed.
C. while the lathe is running slowly.
D. while the lathe is running fast.

T 26.1

The point of a boring tool should be covered when checking the hole

A. to prevent injury to your arm.
B. to prevent damage to the work.
C. to keep the tool warm.
D. to protect the tool from being damaged.

T 26.2

When oil or cutting fluid has been dropped on the floor around the lathe

A. call the shop attendent.
B. inform the instructor.
C. wipe it up yourself.
D. cover it with chips.

T 26.3

By deburring

A. the burrs are only bent over.
B. a visible chamfer is machined on the face.
C. the turned length or the diameter are corrected.
D. the burrs are removed and the sharpness of the edges broken.

T 26.4

The narrowest possible parting tool is used for cutting–off because

A. it reduces the wastage of material.
B. the tool is particularly small.
C. the narrower the cut–off tool, the deeper it can cut.
D. it keeps the load on the machine low.

T 26.5

You should learn to use a file “left–handed” when filing a workpiece chucked in the lathe in order to

A. achieve a better surface quality.
B. prevent your sleeve from catching.
C. see the work more clearly.
D. put a better finish on the work.

MILLING

M 1.1

In climb milling

A. the wear of the cutter is higher than in conventional milling because of the increased friction before cutting into the material.

B. the cutting teeth start cutting the chips from their thick end at once.

C. feed and cutting motions are directed against each other.

M 1.2

The amount of material being cut by a single tooth of a milling cutter during one revolution depends on

A. the feed per tooth and the cutting speed.
B. the depth of cut, the feed and the number of teeth of the cutter.
C. the feed and the diameter of the cutter.
D. the feed, the number of revolutions and the diameter of the cutter.

M 1.3

Milling cutters with helical teeth

A. can be resharpened more easily than those with straight teeth.
B. make the chip removal to the sides of the cutter more difficult.
C. make smooth cutting into the work possible and decrease vibration.
D. are made for climb–milling.

M 1.4

The typical features of a milling cutter for aluminium are

A. small pitch (spacing) and a small number of teeth.
B. relieved teeth of a relative small number.
C. straight teeth with a big rake angle.
D. relative small number of teeth, big spacing (pitch) and big rake angle.

M 1.5

For cutting profiles

A. helical cutters are used.
B. form relieved cutters have to be used.
C. face milling cutters with a large number of teeth are advisable.
D. shell end mills have to be used.

M 2.1

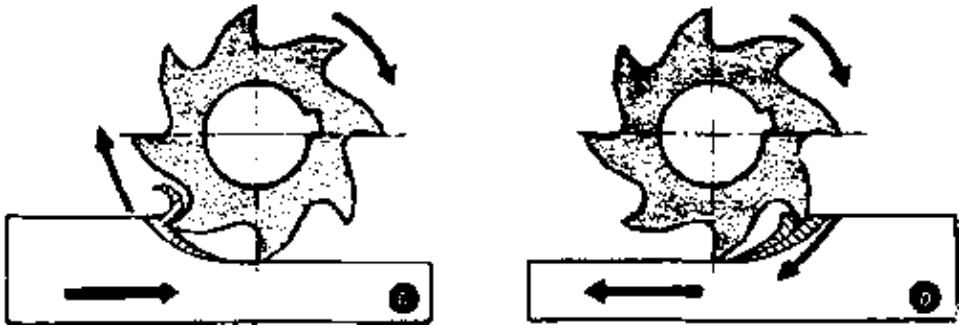
What is the correct name for this tool?

A. Dove–tail milling cutter
B. Angular cutter
C. Prism cutter
D. Bevelled cutter

M 2.2

If you compare conventional milling (a) and climb milling (b), what is one special characteristic of climb milling?

A. Before the cutting teeth enter the material they slide on the machining surface.
B. The spindle of the table must have no play, otherwise the workpiece is drawn into the cutter.
C. The cutting force attempts to lift the workpiece.
D. Strong friction is caused.



M 2.3

Which statement gives correct information about broaching?

A. Broaching is usually applied in the production of single parts.
B. Broaching is only suitable for internal shapes.
C. Broaching is a simple and cheap machining process for the production of a great number of pieces.
D. Broaching is only applied to steel parts.
E. Broaching is normally applied in the production of long cylindrical holes.

M 2.4

Which tools are necessary if you want to produce a spur gear on a Universal Milling Machine?

A. Universal spiral milling attachment.
B. Spur–gear cutter and dividing head.
C. Rack cutting attachment.
D. Swivel vice.

M 3.1

Which statement concerning the module of a gear is correct?

A. The greater the module, the smaller the pitch.
B. If the module of a gear is 1 mm, the circular pitch will be 3.14 mm.
C. Module 1 is equal to a cutting depth of 1 cm.
D. Module 1 is equal to a pitch of 1 mm measured on the top circle.

M 3.2

A spur gear has to be produced on a milling machine by means of the indexing method.

How can you find the cutting depth?

Cutting depth =

A. $\frac{\text{Module}}{\text{no. of teeth}}$

B. Module × ?

C. Module × 0.866

D. $\frac{13}{6} \times \text{Module}$

E. Has to be taken from the tables.

M 3.3

Bent milling arbors cause

A. a very plain surface.
B. a longer tool life of the cutter.
C. a stronger wear of half of the cutter teeth.
D. a force parallel to the axis of the arbor.

M 3.4

What is the disadvantage of inserted tooth milling cutters?

A. Damaged teeth can be exchanged independently.
B. The teeth are made of hard metals, whereas the body of the cutter is made of mild steel.
C. The hard metal teeth allow high cutting speeds.
D. Inserted tooth milling cutters are not suitable for very small diameters.

M 4.1

Which statement about a vertical milling machine is correct?

A. The spindle of this machine normally works in vertical position.
B. This machine has to be installed exactly in vertical position.
C. The table of this machine is in vertical position.
D. The table of this machine can be moved vertically only.

M 4.2

Which statement about the plain milling machine is correct?

A. The table of this machine can be moved horizontally only.
B. The spindle of this machine works in horizontal position.
C. The machine is to be installed very exactly in horizontal position.
D. The milling cutter is to be fed in horizontal position.

M 4.3

For climb–milling

A. the table must be locked firmly to get a very accurate feed motion by hand.
B. the spindle of the table should be without play.
C. the feed should be relatively high while cutting thin chips.

D. the feed movement is usually directed against the direction of rotation.

M 4.4

When milling, reduced vibrations are the result of

A. cutting the work in the centre when using face−cutters.
B. using helical milling cutters.
C. cutting with a cutter having small number of teeth.
D. an arbor being slightly bent.

M 4.5

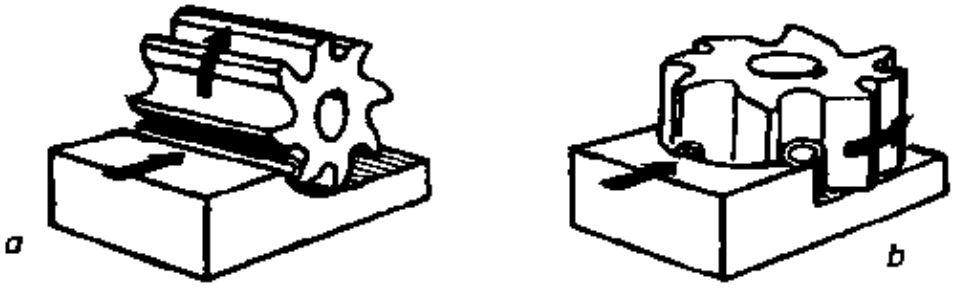
Which of the following tools are necessary for milling the top surface and the dovetail slide (thick lines)?

A. Plain milling cutter, tee−slot cutter, dovetail cutter.
B. Face milling cutter, side milling cutter, dovetail cutter.
C. Plain milling cutter, gang milling cutter, angle milling cutter.
D. Face milling cutter, spiral end mill, dovetail cutter.

M 5.1

Which of the following characteristics is correct for end milling (b) as compared with plain milling (a)?

A. Cutting capacity is about 15 – 20 % higher.
B. The milling machine is unevenly stressed.
C. Work can only be performed on a horizontal milling machine.
D. The machined surfaces have an inferior grade of planeness.



M 5.2

The arbor of a horizontal milling machine should not be tightened until the arbor is supported by means of arbor support in order to

A. give a longer leverage to the spanner.
B. ensure the spanner slipping off the nut when tightened too firmly.
C. prevent bending of the arbor.
D. ensure clearance between cutter and bearings before tightening.

M 5.3

Which special machine would be more suitable if a great number of high quality gears had to be produced?

A. Hobbing machine
B. Duplex−manufacturing milling machine
C. Universal knee− and−column milling machine
D. Vertical milling machine with slotting attachment

M 5.4

Which of the following materials are normally milled without coolants and lubricants?

A. High carbon steel and alloy steel of medium tensile strength.
B. steel of high tensile strength and chilled cast iron.
C. Grey cast iron, synthetic plastics and moulding compounds.
D. Aluminium alloys and copper.

M 6.1

Which of the following instruments or methods is not suitable for checking the planeness of a milled surface?

A. Bevelled steel straight edge
B. Gauge blocks
C. Surface contact method (spotting by using the colour)
D. Try square

M 6.2

The. dividing head is used to

A. locate the centre of round stock.
B. divide the circumference of a workpiece into any number of equal parts.
C. locate hole positions for drilling.
D. divide flat surfaces into any number of equal parts.

M 6.3

Gang milling means

A. several cutters used to do the job in three operations.
B. several cutters mounted on an arbor to cut in one operation.
C. two or more cutters cutting one after the other
D. none of the above.

M 6.4

Which of the following is a correct statement about milling?

A. During the milling operation the main motion (cutting motion) is carried out by the tool.
B. Milling generally involves more idle time than shaping.
C. Milling has the advantage of particularly low tool costs.
D. In modern machine shops milling is more and more replaced by shaping.
E. During the milling operation the main motion (cutting motion) is carried out mainly by the workpiece.

M 6.5

Which of the following units are used for the cutting speed in milling operations?

A. m/sec
B. Rev/min
C. m/min
D. mm/min
E. mm/tooth

M 7.1

Which of the following is a correct statement about end milling?

A. End milling can only be carried out on very heavy milling machines.

B. Another expression for 'end milling' is 'climb milling'.

C. In end milling operations the centre line of the milling cutter is perpendicular to the surface to be machined.

D. The chips produced by an end mill have the shape of a comma.

E. End milling operations can only be applied at the ends of a workpiece.

M 7.2

Which of the following units are used for the feed in milling operations?

A. Meter per minute
B. Centimeter per minute
C. Millimeter per minute
D. Millimeter per revolution
E. Centimeter per revolution

M 7.3

What is the correct name for this tool?

A. Shell end mill
B. Shank type cutter
C. Cylindrical cutter
D. Plain milling cutter
E. Profile milling cutter.

M 7.4

What is the correct name for this tool?

A. Finger cutter
B. Keyway cutter
C. Slotting cutter
D. Shank type end mill

M 7.5

What is the correct name for this tool?

A. Hack saw blade
B. Slotting cutter
C. Keyway cutter
D. Metal slitting saw
E. Side milling cutter

M 8.1

Which of the following is a correct statement about conventional milling?

A. The machined surface has a particularly high quality.

B. When entering into the material the tooth of the milling cutter has to bear the maximum cutting resistance.

C. The cutting motion of the tool and the feed motion of the workpiece have the same direction.

D. Conventional milling can only be carried out on particularly strong machines.

E. During conventional milling the cutting edge gradually penetrates into the material.

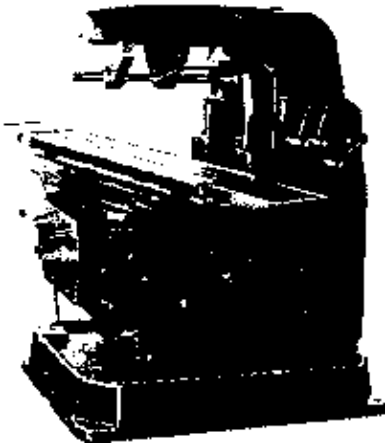
M 8.2

What is the correct name for this tool?

A. Gang milling cutter
B. Slotting cutter
C. Side milling cutter
D. Face milling cutter with inserted blades
E. Shell end mill

M 8.3

What is the correct name for this machine tool?



A. Vertical milling machine
B. Plane milling machine
C. Universal milling machine
D. Automatic milling machine
E. Two spindle planer type milling machine

M 9.1

Which of the following is a correct statement about climb–milling?

A. Climb milling results in a high quality of the machined surface.
B. The cutting edge gradually penetrates into the material.
C. The cutting motion of the tool and the feed motion of the workpiece are oppositely directed.
D. Climb milling is only applied for rough machining of big workpieces.
E. In climb milling, face milling cutters with inserted blades are normally used.

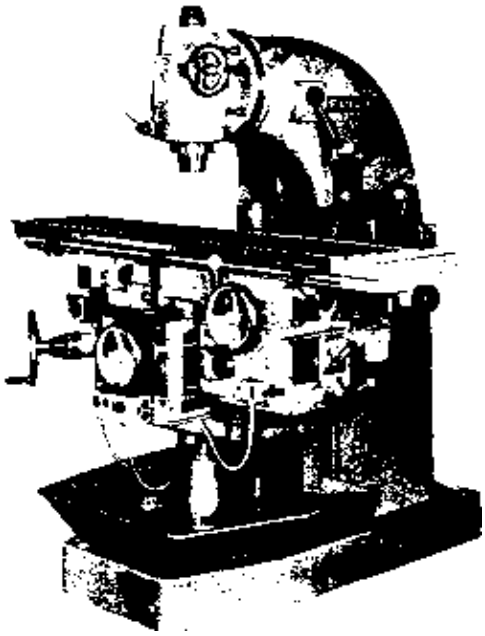
M 9.2

What is the correct name for this tool?

A. Keyway cutter
B. Slotting cutter
C. Staggered tooth milling cutter
D. Plain milling cutter
E. Shank type cutter

M 9.3

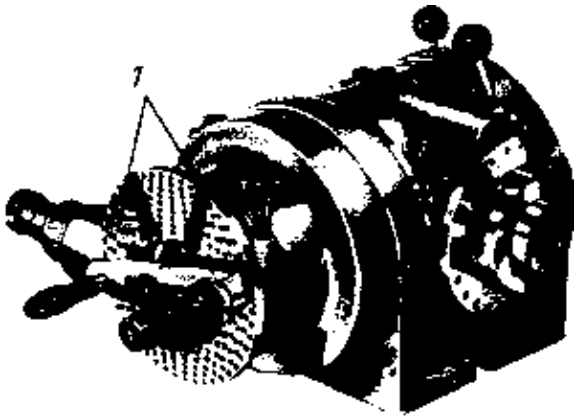
What is the correct name for this machine tool?



A. Horizontal milling machine
B. Universal milling machine
C. Vertical milling machine
D. Keyway milling machine
E. Climb miller

M 10.1

What is the correct name for this machine tool?



A. Dividing head
B. Round table
C. Swivel chuck
D. Plain indexing attachment
E. Tailstock

M 10.2

Which of the given transmission ratios is normally used for dividing head?

A. 1: 40
B. 1: 50
C. 30: 1
D. 40: 1
E. 100: 1

M 10.3

What is the use of the parts marked with '1'?

A. For adjusting the calculated hole circle.
B. For fixing the index plate.
C. These parts save the counting of holes again and again while indexing.
D. For fixing the worm drive during direct indexing.
E. For adjusting the number of divisions during direct indexing.

M 11.1

What is the correct name for this tool?

A. Angular cutter
B. Gang milling cutter
C. End milling cutter
D. Face milling cutter with inserted blade
E. Angular end milling cutter

M 11.2

What is the correct name for this clamping device?

A. Parallel vice
B. Quick acting vice
C. Machine vice with swivel base
D. Universal machine vice
E. Hand lever operated vice

M 11.3

For aligning the work piece on the milling table the dial guage with the magnetic holder can best be mounted on the

A. table side.
B. cutter arbor.
C. overarm.
D. machine column.

M 11.4

The plain milling cutter gets motion from the arbor by

A. the lightened securing nut.
B. a drive ring.
C. a feather key.
D. a dowel pin.

M 11.5

Self centring jaw chucks are particularly suited for milling with the indexing head because

A. their chucking capacity is very high.
B. they clamp the work piece centrally.
C. they can be mounted directly on the cutter spindle.
D. they prevent indexing errors.

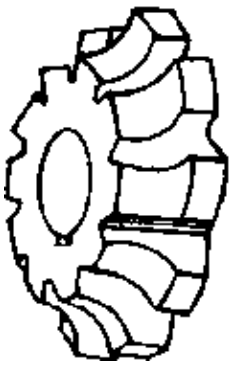
M 12.1

The teeth of a slitting saw are relief ground at the sides in order to

A. reduce the cutting force.
B. ensure that the cutting fluid reaches the cutting points.
C. prevent the saw blade from binding during cutting.
D. facilitate chip removal.

M 12.2

The name of the milling cutter is



A. single–corner rounding cutter.
B. shell end mill.
C. shank–type cutter.
D. gear cutter.

M 12.3

Which arbor is suitable for a shell end mill.

A. long arbor.
B. special arbor.
C. short arbor.
D. shell end arbor.

M 12.4

The long arbor should always be supported on the threaded end

A. before the machine is started.
B. after the arbor nut is tightened.
C. before the clutch is engaged.

D. before the arbor nut is tightened.

M 12.5

To remove chips from the cutter and job, use

A. a piece of cloth.
B. a piece of cotton waste.
C. a brush.
D. your fingers.

M 12.6

Before leaving a milling machine that is in operation

A. slow down the feed.
B. reduce the speed.
C. engage the automatic feed.
D. stop the machine.

M 13.1

Before checking the size of job

A. stop the automatic feed.
B. stop the machine.
C. wipe the finished surface clean.
D. remove the chips from the table with a brush.

M 13.2

Which of the following is referred to as straddle milling?

A. milling two pieces at a time.
B. milling two opposite faces at a time.
C. milling multiple operations at a time.
D. centering two pieces at a time.

M 13.3

When tightening the arbor nut

A. give the wrench several blows with a hammer.
B. place the pipe over the wrench for extra pressure.
C. use only the wrench.
D. drive the wrench with a lead hammer.

M 13.4

Angular indexing is a method by which the dividing head spindle is caused to rotate through a definite

A. number of revolutions.
B. number of divisions.
C. Angle.
D. segment.

M 13.5

On a 40 to 1 dividing head, one revolution of the indexing crank causes the job to rotate through an angle of

A. 40°
B. 9°

C. 90°
D. 1/40°

M 13.6

How many turns of a crank are required to index an angle of 36°? Dividing head ratio 40 to 1

A. 2
B. 4
C. 6
D. 9

M 14.1

Differential indexing is done by a gear differential connecting the index plate with the.

A. sector arms.
B. spindle of indexing head.
C. crank.
D. worm.

M 14.2

You should keep your hands away from the revolving milling cutter

A. so that it will have constant speed.
B. so as not to interfere with its cutting power.
C. to preserve its sharpness.
D. to avoid finger or hand being injured.

M 14.3

A milling machine operator must never reach across or over a revolving milling arbor because

A. he might jam the machine.
B. of the danger of injuries.
C. it affects the accuracy of the machine.
D. of danger of arbor or cutter breakage.

M 14.4

Which of the following methods are <u>not</u> commonly used for holding work on a milling machine?

A. clamps.
B. vices.
C. magnetic chuck.
D. dividing head.

M 14.5

Long overhanging parts of the pieces being clamped on milling machine should be properly

A. aligned.
B. checked.
C. warped.
D. supported.

M 14.6

What instrument is best suited for testing and setting the vice jaws in relation to the milling machine spindle?

A. Combination square
B. Solid square.
C. Parallel block.
D. Dial indicator.

M 15.1

For holding workpiece with a dividing head, the most commonly used device is the

A. three jaw chuck
B. adaptor.
C. collet.
D. centers.

M 15.2

What is the advantage of a 3–jaw chuck over a 4–jaw chuck?

A. more accurate centring.
B. its movements are universal.
C. greater holding power.
D. more convenient for thin jobs.

M 15.3

For what type of milling work is spring collet especially useful?

A. semi–precision.
B. small cylindrical.
C. rough.
D. irregular.

M 15.4

Which of the following cutters is commonly used to mill seats for standard square keys?

A. plain milling cutter
B. side milling cutter
C. end milling cutter
D. woodruff milling cutter

SHAPING AND PLANING

SP 1.1

Which statement about a planing operation is correct?

A. The main motion is carried out by the workpiece; feed motion and cutting depth motion are carried out by the tool.

B. Feed motion is carried out by the workpiece; main motion and cutting depth motion are carried out by the tool.

C. Main motion and feed motion are carried out by the work–piece; the cutting depth motion is carried out by the tool.

D. The cutting depth motion is carried out by the tool; the feed motion is carried out by the table.

E. The feed motion is carried out by the workpiece; the main motion is carried out by the tool.

SP 1.2

An important advantage of the shaping and planing machine when compared with the milling machine is

A. the energy−saving non−cutting stroke.
B. the possibility of machining hard materials without using hard metal tools.
C. the shockabsorbing construction of these machines.
D. the simple and cheap cutting tools.

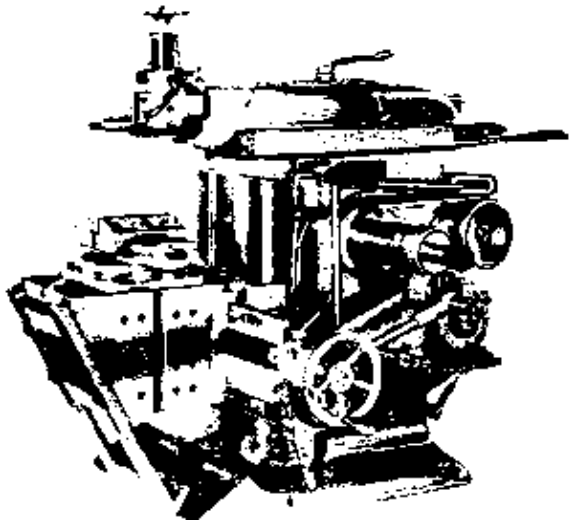
SP 1.3

Suppose, you have to machine a great number of equal work−pieces with internal slots. Which of the following operations would be more suitable for this purpose than shaping?

A. Lapping
B. Broaching
C. Milling
D. Grinding
E. Electrical discharge machining

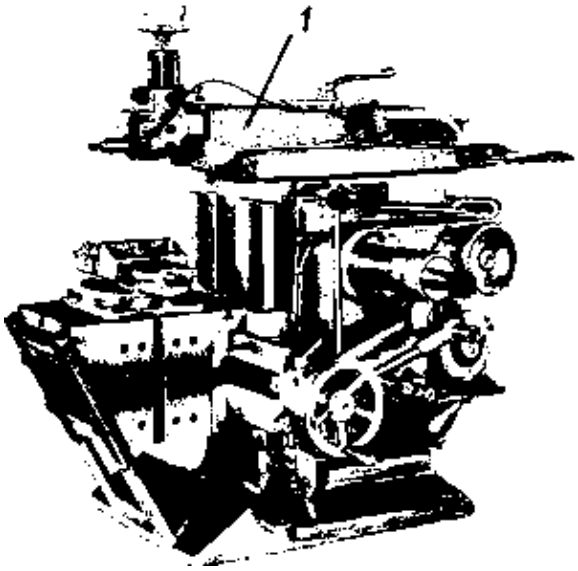
SP 1.4

What is the correct name for this machine tool?



A. Table planer
B. Shaper with mechanically driven ram.
C. Horizontal planer with mechanically driven ram.
D. High−speed planer with hydraulic ram drive.
E. Vertical slotting machine.

SP 2.1



What is the correct name for the part marked with '1'?

A. Ram
B. Planer slide
C. Tool post
D. Slide plate
E. Planer

SP 2.2

The length of the stroke of a shaper is increased by

A. setting the crank pin more away from the centre.
B. increasing the number of revolutions by changing gears.
C. resetting the clapper box and the tool slide.
D. increasing the power feed.

SP 2.3

What machine part does not belong to a shaper?

A. Table
B. Tool post
C. Clapper
D. Ram
E. Cross feed screw

SP 2.4

Which is a correct statement about the shaping operation?

A. The feed motion is carried out by the tool; the main motion is carried out by the workpiece.

B. The cutting depth motion is carried out by the workpiece; the feed motion is carried out by the machine table.

C. Main motion and feed motion are carried out by the work–piece; the cutting depth motion is carried out by the tool.

D. The feed motion is carried out by the workpiece; the main motion and cutting depth motion are carried out by the tool.

E. The main motion is carried out by the workpiece; the feed motion is carried out by the tool.

SP 3.1

The main motion of a shaper or planer includes

A. the cutting depth motion and the feed motion.
B. the working stroke and the feed motion.
C. the working stroke and the non−cutting stroke.
D. the cutting depth motion and the non−cutting stroke.
E. the non−cutting stroke and the feed motion.

SP 3.2

Which part of the planer carries out the feed motion?

A. Tool slide with the tool.
B. The ram with the tool.
C. The workpiece with the machine table.
D. The machine table and the tool.
E. The cross beam.

SP 3.3

Which are the correct units of the feed in shaping and planing operations?

A. mm per second
B. mm per double stroke
C. cm per minute
D. meter per second
E. cm per stroke

SP 3.4

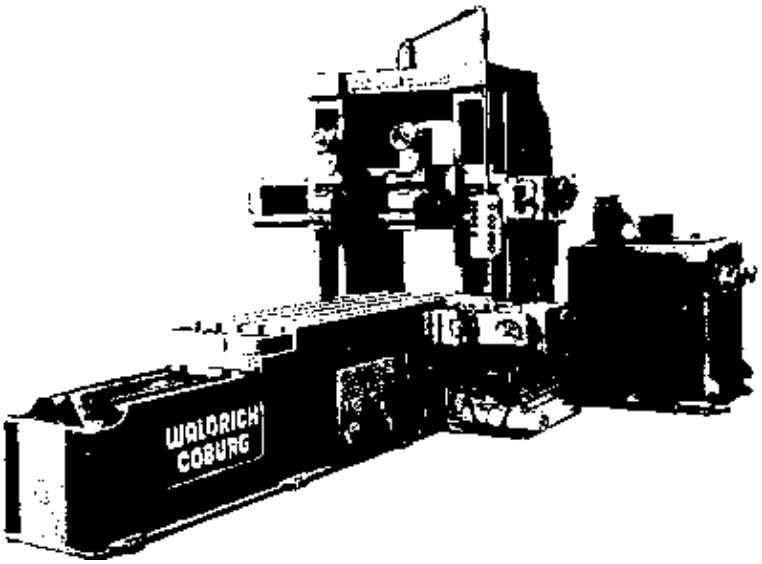
A shaping machine with a mechanically driven ram is adjusted to the maximum length of stroke. Where does the ram reach its maximum speed?

A. At the start of the working stroke.
B. At the end of the working stroke.
C. In the middle of the working stroke.
D. In the middle of the non−cutting stroke.
E. At the end of the non−cutting stroke.

SP 3.5

Why do shaping operations usually have to be carried out in a direction longitudinal to the workpiece?

A. So that the best surface quality is achieved.
B. So that the idle time is minimal.
C. Because the stresses produced during the shaping process are less if the crosswise direction is used.
D. Because the clamping of the tool is easier.
E. Because the surface that has to be machined is smaller than if the crosswise direction is used.



SP 4.1

What is the correct name for this machine tool?

A. Double column shaper
B. Horizontal Shaper
C. Hydraulic shaper
D. Double column planer

SP 4.2

How is the table of this machine tool driven?

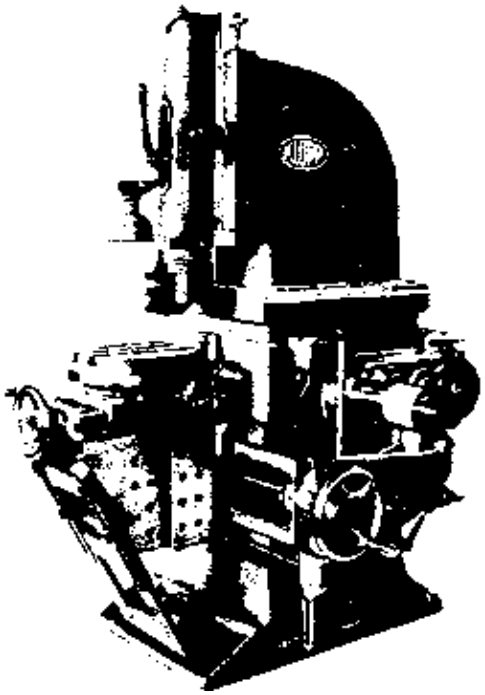
A. By gear and tooth rack.
B. Hydraulically.
C. With the rocker arm.
D. With a friction drive.
E. With a DC–motor.

SP 4.3

Which are the correct units for cutting speed in shaping and planing operations?

A. stroke per minute
B. meter per second
C. double stroke per minute
D. meter per minute
E. cm per stroke

SP 5.1



What is the correct name for this machine tool?

A. Gear shaping machine
B. One column planer
C. Vertical slotting machine
D. Vertical short stroke planer
E. Hydraulic slotting machine

SP 5.2

If you have a carbide tipped shaping tool, what do you especially have to watch for?

A. That the cutting speed is less than with normal tools.
B. That the lifting of the clapper during the back stroke functions with absolute reliability.
C. That machining is only done in a longitudinal direction.
D. That the tool comes out of the clapper at least 3 cm.
E. That for roughing operations the feed does not exceed 0.4 mm per double stroke.

SP 5.3

The length of stroke should exceed the length of the workpiece because

A. the clapper must go back to its correct cutting position.
B. the fast return stroke motion must be slowed down before cutting.
C. the cutting tool shall not knock too hard into the material.
D. overheating of the cutting tool must be avoided.

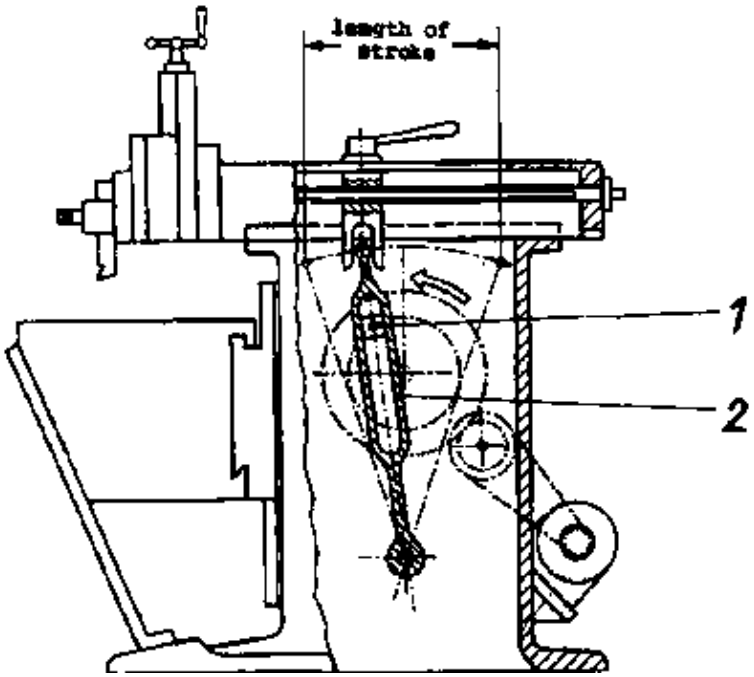
SP 5.4

The cutting speed of the shaping machine is <u>not</u> influenced by

A. the gear box.
B. the position of the crank pin.
C. the cutting position of the ram.
D. the length of the stroke.

SP 6.1

What is the correct name for the part marked with '1'?



A. Crank joint
B. Friction plate
C. Lock nut
D. Spindle screw
E. Sliding block

SP 6.2

What is the correct name for the part marked with '2'?

A. Tooth rack
B. Adjustment lever
C. Rocker arm
D. Angle joint
E. Ram lever

SP 6.3

What is changed if part 1 is shifted towards the centre of the slot in part 2?

A. The ram no longer moves.
B. The length of the stroke is decreased.
C. The position of the stroke.
The tool works at the very end of the table.
D. The length of the stroke is increased.
E. The position of the stroke is shifted to the first third of the table.

SP 6.4

The mechanical drive of the shaper produces an increased speed for the return stroke because

A. the tool and the ram have a shorter way back.
B. the crank pin needs a shorter time for the equal return distance.
C. the travel of the crank pin during the return stroke is shorter.
D. the crank pin moves faster during the return stroke.

SP 7.1

The hydraulic shaper operates with a higher return stroke speed because

A. the volume of the cylinder is reduced by the rod of the piston.
B. there is less counter pressure when returning (no cutting).
C. the piston pressure area is bigger for the return stroke.
D. the oil is flowing in with increased speed during the return stroke.

SP 7.2

The shaper cutting tool differs from the lathe cutting tool in that

A. it is made of mild steel.
B. it moves faster.
C. it has less front and side clearance.
D. it feeds down to the work.

SP 7.3

The clearance angle on a shaper tool bit should not exceed.

A. 2°
B. 4°
C. 6°
D. 8°

SP 7.4

Giving the shaper tool too much clearance results in

A. cutting a thinner chip.
B. giving the work a better finish.
C. heating up the workpiece
D. dulling quickly.

SP 7.5

A vertical shaper is a special kind of shaper which has

A. a vertical work feed.
B. a vertically operating ram.
C. a vertical tool post.
D. a vertical table feed.

SP 8.1

Which of the following adjustments can be made on the ram of a vertical shaper?

A. Angular adjustment
B. Adjustment for depth of cut
C. Adjustment for radial cut
D. Horizontal adjustment

SP 8.2

Where is the length of stroke setting shaft located while looking from the table side?

A. On the left hand side of the shaper.
B. On the right hand side of the shaper.
C. On the cross rail.
D. On the ram.

SP 8.3

The cutting stroke is slower than the return stroke because

A. the cutting tool bends.
B. the work offers resistance.
C. of the mechanical arrangement of the crank drive.
D. the motor slows down.

SP 8.4

The workpiece is commonly held in the shaper by means of

A. a chuck.
B. a collet.
C. a vice.
D. a “C”–clamp.

SP 8.5

What is the purpose of the clapper box?

A. To store cutting tools.
B. To signal when the work is finished.
C. To clamp the cutting tool.
D. To provide clearance for the cutting tool during the return stroke.

SP 8.6

The length of the job determines the

A. speed of motor.
B. depth of cut.
C. length of stroke.
D. rate of feed.

SP 9.1

When using the down feed mechanism for performing angular cuts how should the clapper box be swivelled?

A. Towards the surface being machined.
B. To the right.
C. Away from the surface being machined.
D. To the left.

SP 9.2

Why is the shaper provided with several speed changes?

A. To accommodate machining of different kinds of material.
B. To permit deeper cuts.
C. To permit different feeds.
D. So that larger tool bits can be used.

SP 9.3

Which of the following is correct for adjusting the shaper for workpieces of different thickness?

A. Swivel the vice.
B. Adjust the table vertically.
C. Shorten the stroke.
D. Use a shorter tool bit.

SP 9.4

Looking from the table side, where should the operator stand while the shaper is in motion?

A. Directly in front.
B. To the right hand side.
C. To the left hand side.
D. Directly behind.

SP 9.5

Before mounting the vice on the table of the shaper

A. move the ram to its most forward position.
B. remove dirt and chips from the base of the vice and table.
C. lower the table to its lowest position.
D. place a metal or plastic shield or a wire mesh screen over the tool bit.

SP 10.1

During the return stroke the tool is lifted up in order to

A. protect the ram drive system.
B. lessen the depth of cut.
C. achieve greater depth of cut.
D. protect the tool edge.

SP 10.2

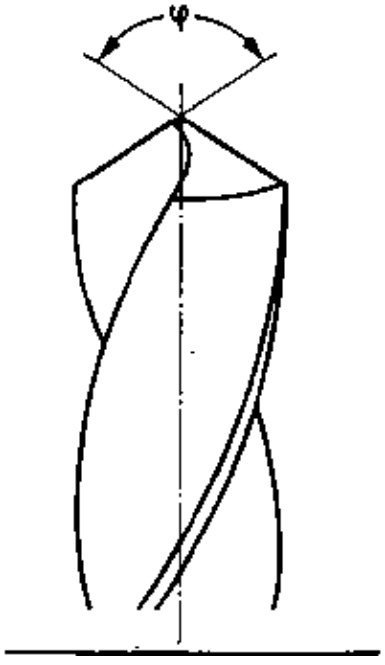
The return speed of the ram is higher than its forward speed because

A. of the crank mechanism principle.
B. the tool is lifted off during the return stroke.
C. the drive motor is changed over.
D. no material is removed during the return stroke.

DRILLING AND REAMING

DR 1.1

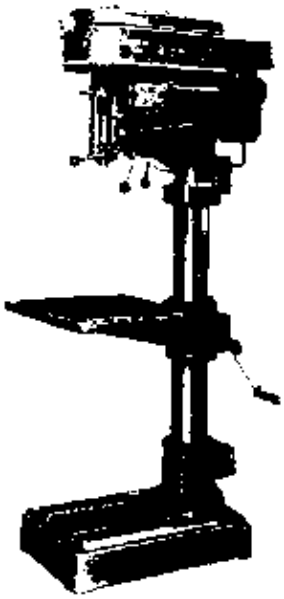
What is the correct name for the angle ??



A. Top rake
B. Clearance angle
C. Point angle
D. Spiral angle
E. Wedge angle

DR 1.2

What is the correct name for this machine?



A. Bench drilling machine
B. Radial drilling machine
C. Jig boring machine
D. Gang drilling machine
E. Column drilling machine

DR 1.3

This tool is normally used

A. for finish boring of rough drilled holes.
B. for finish reaming of cast holes.
C. for chamfering of internal threads.
D. for chamfering at inclined surfaces.
E. for the production of holes for countersunk riveting.

DR 2.1

If the drill jams and stops in the hole being drilled

A. hit the drill on one side.
B. increase feed pressure.
C. reverse the direction of rotator.
D. stop the machine and turn by hand.

DR 2.2

Which of the following materials is usually drilled without a lubricant or coolant?

A. Grey cast iron
B. High alloy steel
C. Cast steel
D. Tool steel
E. Mild steel

DR 2.3

A twist drill has been ground as shown in the sketch. What effect on the drilling operation do you expect?

A. The chips will block the flutes.
B. The drill cannot penetrate into the material.
C. Only one cutting edge will cut; thus it will be blunt soon.
D. The cutting edge '2' will break off after a few revolutions.
E. The cutting edge '1' does not cut at all.

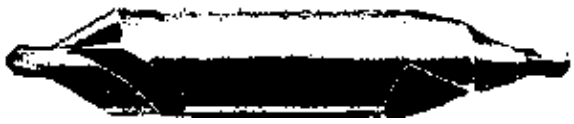
DR 2.4

Which of the following angle sizes cannot be influenced by regrinding at a twist drill?

A. Point angle
B. Clearance angle
C. Wedge angle
D. Spiral angle

DR 2.5

What is the correct name for this tool?



A. Step drill
B. Double side drill
C. Chamfering drill
D. Centre drill
E. Hardmetal drill

DR 3.1

Which size of the point angle is correct when drilling mild steel?

A. 140°
B. 130°
C. 118°
D. 95°
E. 80°

DR 3.2

A twist drill has been ground as shown in the sketch. What can be observed if “St 50” is drilled with it?

A. A greater force has to be applied.
B. The bore hole will be oversized.
C. The drill will run untrue.
D. The cutting edges break out because the clearance angle is too big.
E. The drill wobbles; the hole becomes non–cylindrical.

DR 3.3

What special feature do you observe at this twist drill?

A. It has 4 lands.
B. It has a tapered shank.
C. It has a very small top rake.
D. It is a left hand twist drill.
E. It has an additional groove for coolants.

DR 3.4

For which of the following material has this twist drill to be used?

A. Brass
B. Aluminium
C. Hard plastic
D. Mild steel
E. Concrete

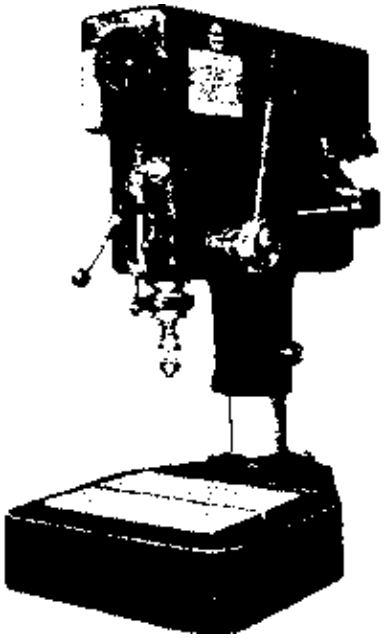
DR 4.1

For which of the following materials has this twist drill to be used?

A. Copper
B. Grey cast iron
C. Brass
D. Aluminium
E. Concrete

DR 4.2

What is the correct name for this machine?



A. Bench drilling machine
B. Workbench drilling machine
C. Small type column drilling machine
D. Thread cutting machine
E. Jig boring machine

DR 4.3

What is the purpose of using lubricants for thread cutting?

A. To achieve a better flow of chips.

B. To avoid heating up and spoiling the tap.

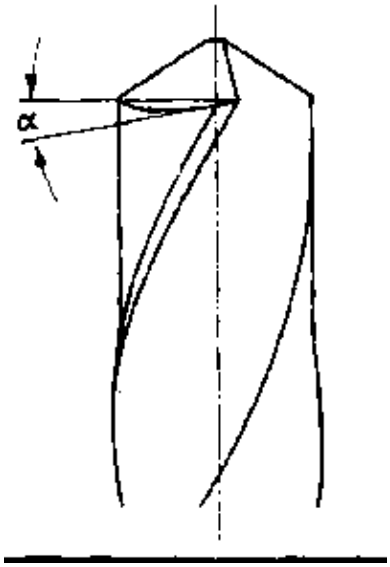
C. To avoid oxidation of the flanks of the thread which otherwise starts immediately after the threading process.

D. To produce long chips.

E. To decrease the friction between the already cut thread and the tap.

DR 5.1

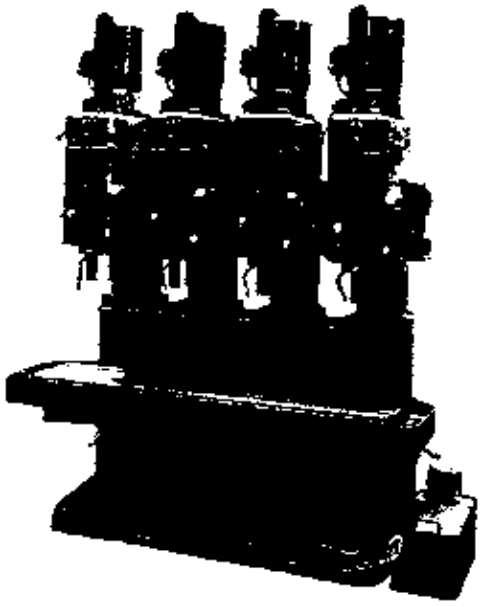
What is the correct name for the angle ??



A. Clearance angle
B. Top rake angle
C. Point angle
D. Spiral angle
E. Wedge angle

DR 5.2

What is the correct name for this machine?



A. Radial drilling machine
B. Horizontal boring machine
C. Jig boring machine
D. Gang drilling machine
E. Multi–spindle drilling machine

DR 5.3

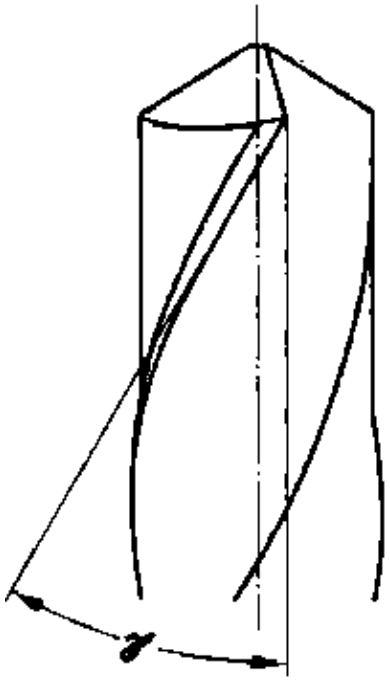
This tool is usually used

A. for deburring of very hard and tough materials.
B. for finish boring of cast holes.
C. for the production of extremely accurate holes.
D. for the production of counterbores for cheese head screws.

E. for rough drilling of very big bore holes.

DR 6.1

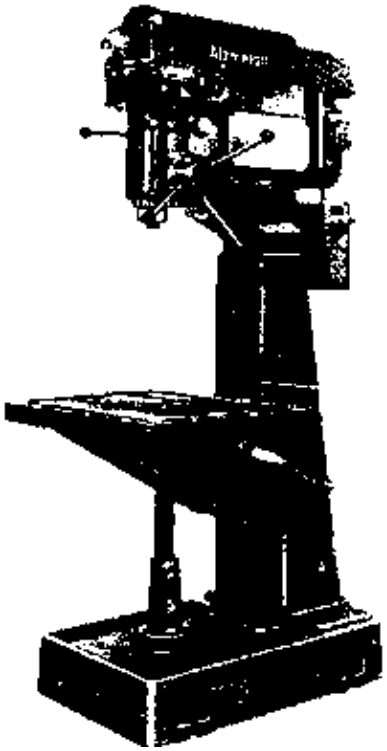
What is the correct name for the angle ??



A. Point angle
B. Top rake
C. Clearance angle
D. Wedge angle
E. Spiral angle

DR 6.2

Which statement about the drilling machine shown in the picture is correct?



A. The table of this machine can be swivelled.
B. The feed of the drill can only be achieved by lifting the table.
C. This machine has only two fixed numbers of revolutions.
D. This machine allows several bore holes to be drilled without the necessity of reclamping.
E. The rigid construction of this machine allows a high drill pressure.

DR 6.3

What is the reason for the fact, that reamers usually have even number of cutting edges?

A. To make measuring of the dia easier.
B. To avoid chatter marks at the surface of the hole.
C. To make the production of reamers cheaper.
D. To make the reamer suitable for right as well as for left hand cutting.
E. To allow for the regrinding of reamers as often as required.

DR 7.1

Reamers usually have an unequal spacing between the cutting edges. What is the reason for this?

A. To have a complete flow of chips even out of blind holes.
B. To get a high quality of the reamed surface.
C. To make it possible that the same reamer can be used for hard as well as for soft materials.
D. To allow for the regrinding of the reamer as often as required.
E. To make it possible that reaming could be done with the speed which is used for rough drilling.

DR 7.2

The core hole for the production of an internal thread is always bigger than the core dia of the tap. What is the reason for this?

A. To avoid jamming the tap because during the threading operation material is squeezed up in the top of the thread at the tap.

B. To prevent the tap running untrue.

C. To allow for cutting without a coolant.

D. To make a first cut unnecessary.

E. To eliminate the need for countersinking the core hole.

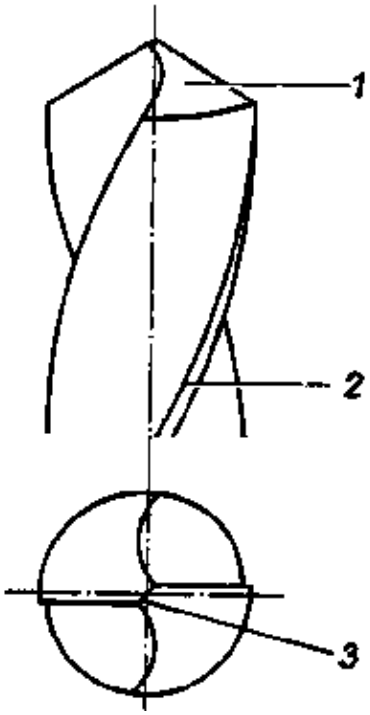
DR 7.3

What is the correct name for this tool?

A. Machine reamer with helical flutes
B. Helical shell reamer
C. Taper pin reamer
D. Hand reamer
E. Adjustable reamer

DR 8.1

What is the correct name for part “3”?



A. Dead centre
B. Web
C. Flute
D. Cutting edge
E. Land

DR 8.2

Taps have to be turned back a bit during the threading operation. What is the reason for this?

A. To break the chips and thus to prevent them from getting jammed in the flutes of the tap.

B. This guarantees that the thread is cut accurately in right angular direction.

C. Thus the cutting edges are automatically polished and the tap remains sharp.

D. This makes sure that the chips are transported upwards through the flutes of the tap and out of the bore hole.

E. This prevents the material being squeezed up in the top of the thread.

DR 8.3

What is the correct name for this tool?

A. Adjustable hand reamer
B. Adjustable machine reamer
C. Shell reamer
D. Counterbore
E. Taper pin reamer

DR 9.1

Holes are reamed after drilling in order to

A. increase the service life of the drill.
B. make drilling easier.
C. avoid counterdrilling or countersinking.
D. get holes more accurate in diameter and roundness.

DR 9.2

Big drills get web thinning in order to

A. reduce feed pressure and make penetration easier.
B. reduce cutting force and make chip removal easier.
C. make sure that the lip clearance is sufficient.
D. make sure that the drill will not drag into the material.

DR 9.3

A drill having a 0° lip clearance after resharpening, will

A. penetrate easier because of the reduced resistance to penetration.
B. cut the hole oversize.
C. break due to the increased feed.
D. cause friction without cutting chips.

DR 9.4

The point angle on drills that are used for soft plastics is

A. 60° to 100°
B. 150°
C. 118°
D. 120°

DR 9.5

A drill with different lip lengths will drill

A. oversized holes.
B. undersized holes.
C. correct sized holes.

D. unround holes.

DR 9.6

A hole is to be finished with a reamer H7 of 36 mm diameter. What drill is to be used?

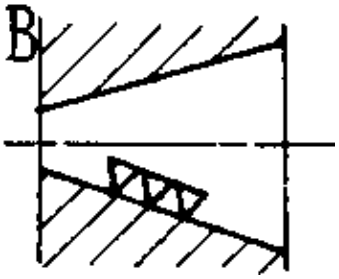
A. 36.2
B. 35.6
C. 36.0
D. 35.8
E. 35.2

DR 10.1

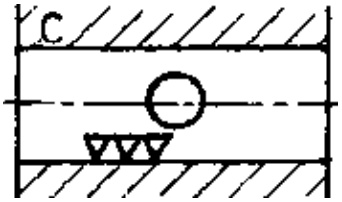
Which statement is not correct if you compare it with the corresponding figure?

A. Reamer with helical flutes has to be used.

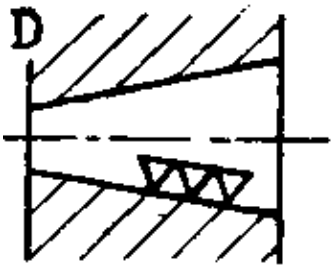
B. Roughing operation has to be carried out with a roughing reamer.



C. Reamer with helical flutes should be used.



D. Pre–drilling has to be carried out with a taper drill.



DR 10.2

How is a reamer removed out of the hole?

A. By pulling it out without turning.
B. By pulling and turning in the cutting direction.
C. By pulling and turning against the cutting direction.
D. By pulling and turning to and from.

DR 10.3

Expansion reamers are to be expanded

A. before regrinding.
B. according to the required diameter of the hole.
C. to get thick chips.
D. to reach a longer service life.

DR 10.4

The drill is safely and easily removed from the spindle with a

A. cross cut file.
B. drill drift.
C. tang of a file.
D. round–nose file.

DR 11.1

Reamers with helical flutes are used

A. on the lathe machine only.
B. for small diameters only.
C. for conical holes only.
D. for holes with slots.

DR 11.2

While drilling, one works with

A. high speed and low feed.
B. high speed and high feed.
C. low speed and low feed.
D. low speed and high feed.

DR 11.3

In a workpiece of mild steel a hole 6^{H7} has to be produced by drilling and reaming.
What should the dia of the twist drill be?

A. 6.1 mm
B. 6.0 mm
C. 5.95 mm
D. 5.8 mm
E. 5.5 mm

DR 11.4

The counterbore is a tool used to

A. ream a hole.
B. enlarge a hole partially.
C. tap a hole.
D. drill a hole.

DR 11.5

The countersink is used to enlarge the end of a hole to a shape like a

A. square.
B. flat piece.
C. cone.
D. dovetail.

DR 12.1

Good guidance of a reamer is made sure by

A. a high number of teeth at the circumference of the reamer.
B. a long tapered part of the hand reamer.
C. a low feed and speed when reaming.
D. using a helical reamer.

DR 12.2

A twist drill, ∅ 20 mm, drills a hole of ∅ 20.2 mm. Which fault is the cause of this?

A. Wrong top angle.
B. Drill ground out of centre.
C. Lip clearance not correct.
D. Web wrongly thinned.
E. Drill is blunt.

DR 12.3

Which statement is incorrect?

A. Reamers usually have a left−hand helix to remove chips downwards.
B. Helical reamers are necessary for holes with keyways.
C. The cutting edges of reamers are unequally spaced.
D. The cutting edges of hand reamers are longer than those of machine reamers.

DR 12.4

The included angle of a centre hole is

A. 30°
B. 45°
C. 60°
D. 100°

DR 12.5

Hand reamers can be distinguished from machine reamers because of their

A. longer tapered part.
B. helical teeth.
C. bigger number of teeth.
D. unequal spacing (pitch).

DR 13.1

The web of a twist drill

A. causes resistance to feeding since it does not cut but it squeezes.
B. guides the drill when breaking through the material.
C. carries the main part of the chip removal.
D. is always directed rectangular to the main cutting lips.

DR 13.2

Before inserting the drill into the taper sleeve or spindle of a drilling machine

A. slow down the motor.
B. switch on the motor.
C. clean the drill shank and sleeve or spindle.
D. clean the chips from the table.

DR 13.3

A twist drill for aluminium is distinguished by its

A. point angle of 180°.
B. slow helix.
C. small rake angle caused by the flutes.
D. left−hand helix which produces long continuous chips.

DR 13.4

Bigger holes should be pre−drilled

A. to avoid running off centre and to reduce the cutting force when drilling with big drills.
B. to reduce thickness of chips, feed and cutting force.
C. to prevent the big drills from dragging into the work.
D. to shorten the web of the drill.

DR 13.5

The amount of material left for reaming depends mainly on the

A. diameter of the hole and the kind of metals to be reamed.
B. length of the hole.
C. shape of the teeth (straight or helical).
D. cutting speed of the reamer.

DR 14.1

The size of the counterbore pilot will depend upon the

A. depth of a hole.
B. size of the hole to be counterbored.
C. speed of the drill press.
D. material to be counterbored.

DR 14.2

As compared to drill the speed of the counterbore should be

A. same.
B. faster.
C. slower.
D. may be slower or may be faster.

DR 14.3

Reamer wear faster when

A. not enough stock is left for reaming.
B. too much stock is left for reaming.
C. soft steel is being reamed.
D. copper is being reamed.

DR 14.4

The flutes of a reamer are provided for the purpose to

A. avoid chattering.
B. maintain size.
C. carrying out the chips.
D. allowing air to reach the work.

DR 14.5

Shell reamers are used for their

A. accuracy.
B. lightness.
C. economy.
D. wear resistance.

DR. 15.1

When drilling thin metal sheet, the best and safest results are obtained by

A. breaking the edge of the drill.
B. clamping the work in a hand vice.
C. nailing the job to a wooden piece.
D. clamping the job with the table.

DR 15.2

While spot facing, you

A. enlarge the hole.
B. machine the wall surface of the hole.
C. machine the face surface around the hole.
D. cut internal threads.

DR 15.3

The pilot hole should be equal to

A. one quarter the diameter of the larger hole.
B. one eighth the diameter of larger hole.
C. the web thickness of the drill for larger hole.
D. the width of the margin of the larger drill.

DR 15.4

To drill circumferential surface of cylindrical workpieces, place the job

A. in a vice.
B. over parallel blocks.
C. in a monkey wrench.
D. in a V–block and a clamp.

DR 15.5

When you are drilling, squeaking indicates

A. a dull drill.
B. that the metal is too soft.
C. that the metal is too hard.
D. that the work is clamped too lightly.

DR 15.6

While clamping the job on drill table place the clamping bolt close to

A. drill.
B. work.
C. step block.
D. V–belt.

DR 16.1

When you feel the drill breaking through the metal it is a safe practice to

A. apply more pressure.
B. lessen the pressure.
C. apply more lubricant.
D. stop the machine.

DR 16.2

Drills will not cut holes of the correct size unless they are

A. properly lubricated.
B. correctly ground.
C. firmly held.
D. held in a taper sleeve.

DR 16.3

If the drill runs untrue, it will

A. get too hot.
B. cut undersize.
C. distort the spindle.
D. cut oversize.

DR 16.4

Feeding the drill too fast into the work may result in

A. breaking the drill.
B. bending the drill.
C. cutting an oval shape.
D. increased production.

DR 16.5

Running the drill too fast may result in

A. spoiling the cutting edge.
B. poor surface quality.
C. twisting the tang.
D. drilling oval holes.

DR 16.6

A drill with a worn margin will

A. drill holes oversize.
B. drill holes undersize.
C. run out of centre.
D. drill an accurate hole.

DR 17.1

Why have helical reamers a left–hand helix?

A. To avoid hooking into keyways at the hole.
B. To prevent the reamer from being dragged into the material.
C. To ease lifting the chips off the hole.
D. To enable anticlockwise turning to get the reamer out after reaming.

DR 17.2

The main purpose of the lands of a twist drill is

A. to allow an exact grinding.
B. to achieve a better chip flow.
C. to achieve an accurate reaming of the hole.
D. to get a better surface of the hole.
E. to assure a good guidance in the hole.

GRINDING

Gr 1.1

Which of the following is a correct statement about the grain of a grinding wheel?

A. Fine grain allow high cutting capacity.
B. The finer the grain the harder the grinding wheel.
C. Grinding wheels with a coarse grain are not suitable for wet grinding.
D. The finer the grain the smoother the surface of the ground workpiece.
E. The finer the grain the lower the cutting speed which has to be chosen.

Gr 1.2

Dressing the grinding wheel with a diamond point

A. results in rounding the wheel and removing the glaze.
B. results in an increase of the cutting speed of the grinding wheel.
C. results in a greater hardness of the grinding wheel.
D. results in a decrease of hardness of the grinding wheel.

Gr 1.3

The ideal grinding wheel will

A. wear away as the abrassive particals become dull.
B. wear away at a predetermined rate.
C. wear away slowly to save money.
D. has hard bond and soft abrassive.

Gr 1.4

The code C 80 K 4 indicates a grinding wheel

A. which consists of aluminium.
B. which is suitable for grinding cemented carbide (hard metal) tools.
C. that has coarse grain.
D. that is very hard.

Gr 1.5

Grinding wheels with fine grain are suitable for

A. high feed and rough surfaces.
B. cylindrical grinding only.
C. hard materials.
D. soft materials.

Gr 2.1

Which of the following is a correct definition of the hardness of a grinding wheel?

A. The hardness of the grains in HRC.
B. The hardness of the grinding wheel in comparison with diamond hardness.
C. The Brinell hardness of the bond.
D. The hardness of the grains in comparison with diamond hardness.
E. The resistance which the bond offers against the breaking out of the grains.

Gr 2.2

Which statement about grinding is incorrect?

A. Emery is an impure form of aluminium oxide.
B. Aluminium oxide is harder than silicon carbide.
C. Silicon carbide is produced in the arc furnace.
D. For hard grinding stones we do not always need silicon carbide abrasives.

Gr 2.3

The grinding wheel should be so hard that it

A. allows easy dressing with cemented carbide (hard metal) tools.
B. permits dull and worn abrasives to break out during grinding operation.
C. prevents the grains from breaking out.
D. withstands any wear.

Gr 2.4

Which of the following is a correct statement about grinding wheels with vitrified bond?

A. At high temperatures these grinding wheels become sticky.
B. These grinding wheels are suitable for very high circumferential speeds.(up to 100 m/sec).
C. They are sensitive against shock and pressure.
D. Their main field of application is surface grinding of hard metals (cemented carbides).
E. They need not be balanced.

Gr 3.1

Which of the following is a correct statement about the hardness of a grinding wheel?

A. The hardness of grinding wheel depends upon the hardness of the abrasive.
B. A hard grinding wheel is most suitable for hard materials.
C. A soft grinding wheel is most suitable for hard materials.
D. For hard grinding wheels the need of dressing does not arise.

E. Hard grinding wheels need not be balanced.

Gr 3.2

The hardness (grade) of a grinding wheel depends on

A. the shape of the grinding wheel.
B. the type of abrasives used.
C. the bond used.
D. the size of the abrasive grains used.

Gr 3.3

The fundamental elements of a grinding wheels are kind and size of abrasive and the kind and size of

A. bond.
B. silicon.
C. oxide.
D. carbide.

Gr 3.4

The kind of abrasives used in most wheels are silicon carbide and

A. cemented carbide.
B. ceramics
C. resinoid.
D. aluminum oxide.

Gr 3.5

Silicon carbide wheels are used for grinding

A. high tensile strength materials.
B. low tensile strength, hard and brittle materials.
C. hardend steel.
D. cold rolled steel.

Gr 3.6

Aluminous oxide wheels are used for grinding

A. steel.
B. brass.
C. bronze.
D. copper.

Gr 4.1

Too much pressure applied to the wheel may

A. overheat the bearings.
B. burn the job.
C. distort the spindle.
D. break the wheel.

Gr 4.2

If a grinding wheel is made to revolve faster than that recommended by the manufacturer, it may

A. spoil the job.
B. burn out the bearings.

C. remove too much metal.
D. break or fly apart.

Gr 4.3

A No. 46 abrasive is classified as

A. extra fine.
B. coarser.
C. medium.
D. fine.

Gr 4.4

The kind of bonds used most frequently are vitrified and

A. resinoid.
B. rubber.
C. silicate.
D. shellac.

Gr 4.5

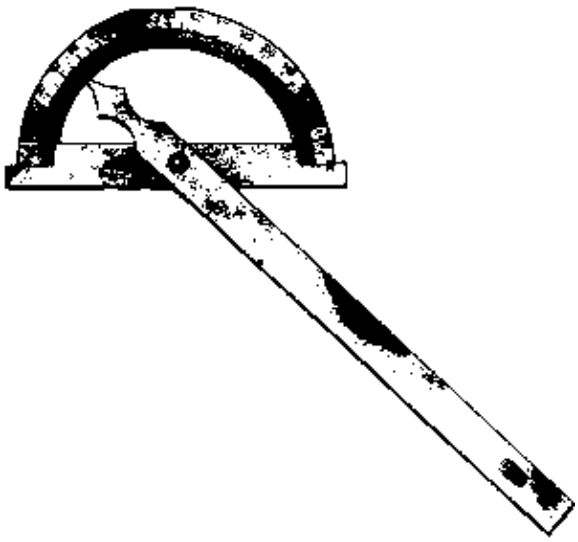
What kind of bond is not affected by oils, acids, water or temperature?

A. Vitrified
B. Resinoid
C. Shellac
D. Rubber

MEASURING AND CHECKING

MC 1.1

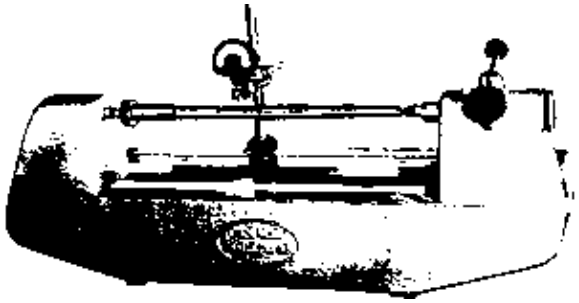
What is the correct name for this measuring instrument?



A. Setting angle
B. Universal bevel protractor
C. Universal bevel
D. Angle
E. Plain protractor

MC 1.2

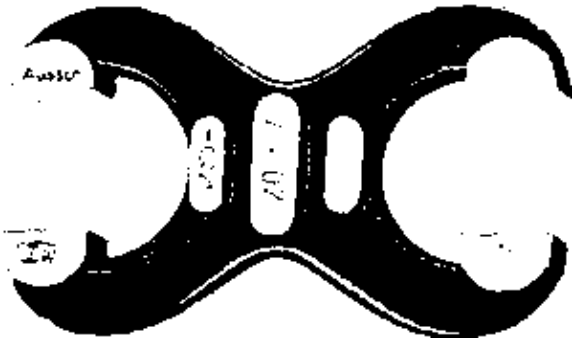
For which operation is this instrument particularly suitable?



A. Measuring of shaft diameters.
B. Checking the conical form of turned work–pieces.
C. Checking concentric (true) running.
D. Checking the surface roughness of cylindrical workpieces.
E. Hardness testing.

MC 1.3

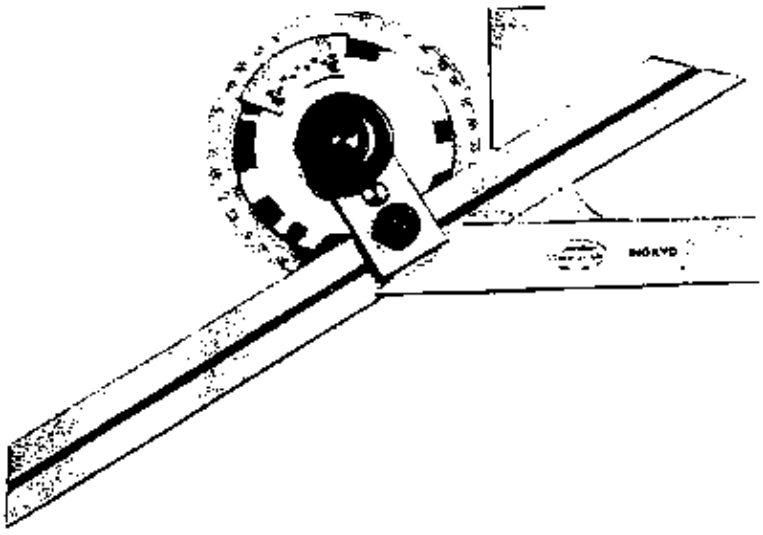
What is the correct name for this checking instrument?



A. Snap gauge
B. Twin gauge
C. Limit hole gauge
D. Outside calipers

MC 2.1

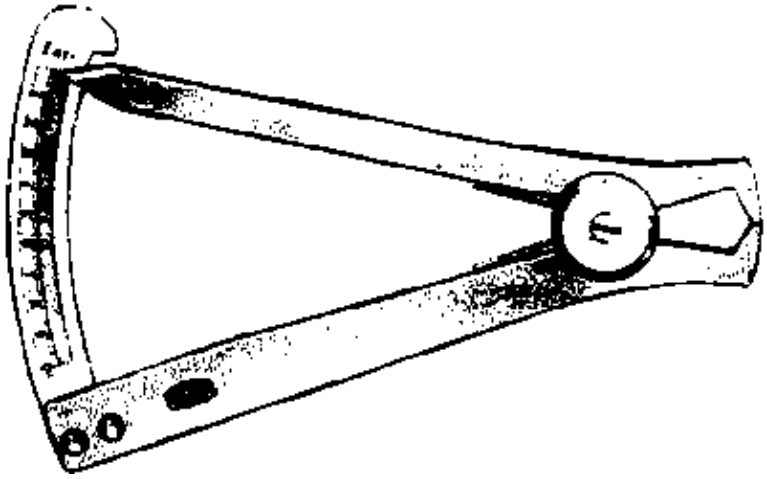
What is the correct name for this measuring instrument?



A. Setting angle
B. Universal bevel protractor
C. Universal bevel
D. Angle
E. Plain protractor

MC 2.2

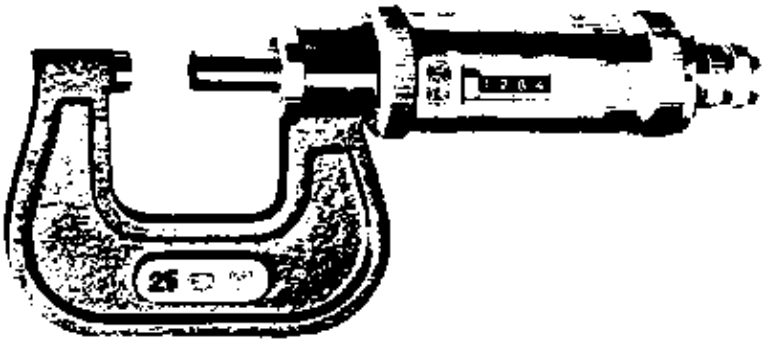
For which operation is this instrument particularly suitable?



A. Measuring the thickness of sheet metal.
B. Checking the pitch of threads.
C. Measuring the pitch of gears.
D. Measuring very thin and soft materials.
E. Measuring hole diameters.

MC 2.3

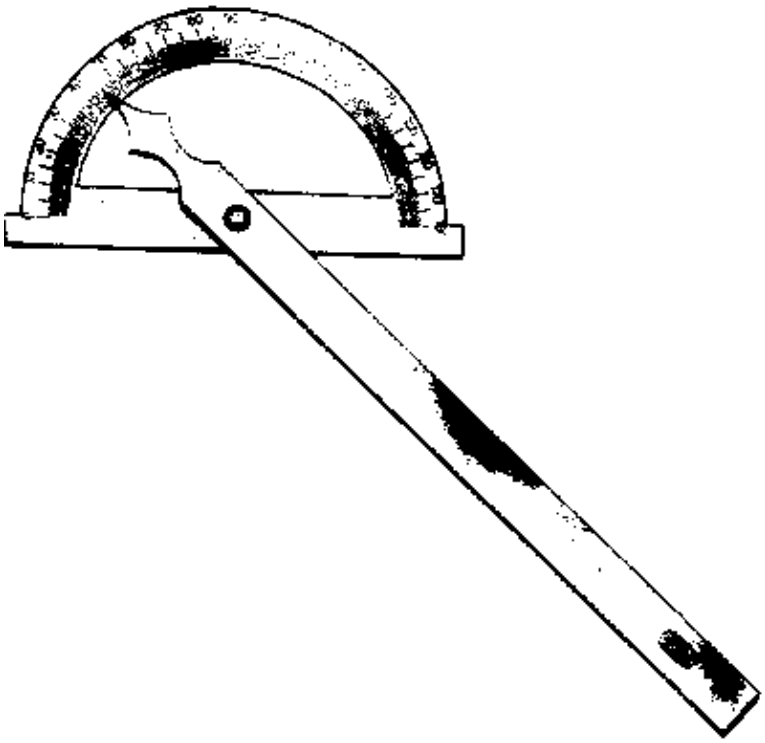
What is the meaning of the figure '25' on the frame of the micrometer?



A. Reference temperature 25 C.
B. The accuracy of the spindle pitch is within the limits of 25 ?m.
C. Measuring range from 0 to 25 mm.
D. Measuring accuracy guaranteed for a measuring pressure up to 25 N only.

MC 3.1

What is the smallest division on the scale of this instrument?



A. 2 degrees
B. 1 degree
C. 1/10 degree
D. 10 minutes
E. 1 minute

MC 3.2

What is the purpose of the pointed wedge−shaped legs (part 1) of the vernier caliper?

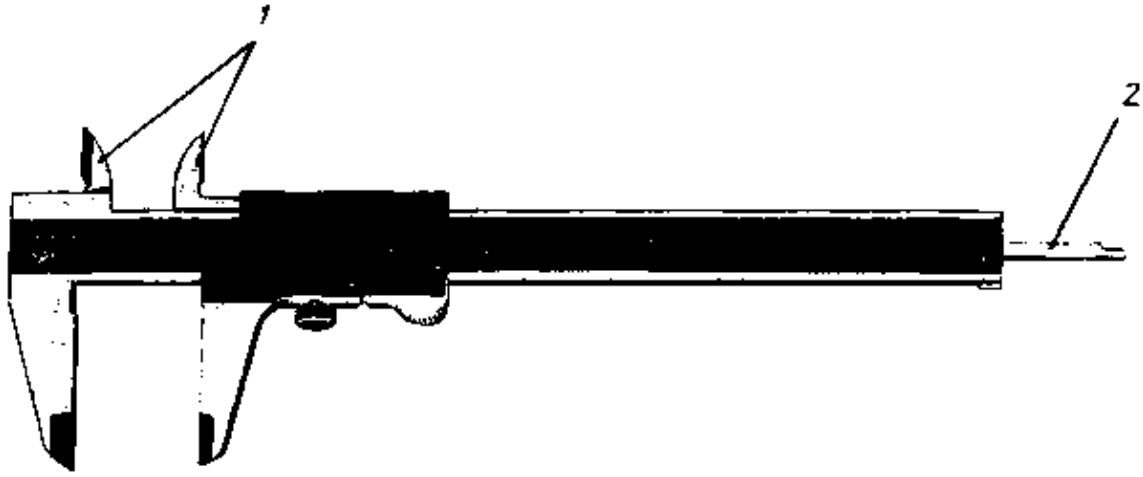
A. To mark hole distances.
B. To mark rusty workpieces
C. To measure internal dimensions and the width of keyways.
D. To measure core diameters of external threads.
E. To measure shaft diameters.

MC 4.1

For which measuring operation is the part marked with '2' particularly suitable?

A. Measuring hole distances.
B. Checking the pitch of threads.
C. Measuring the width of keyways.
D. Checking big hole diameters.

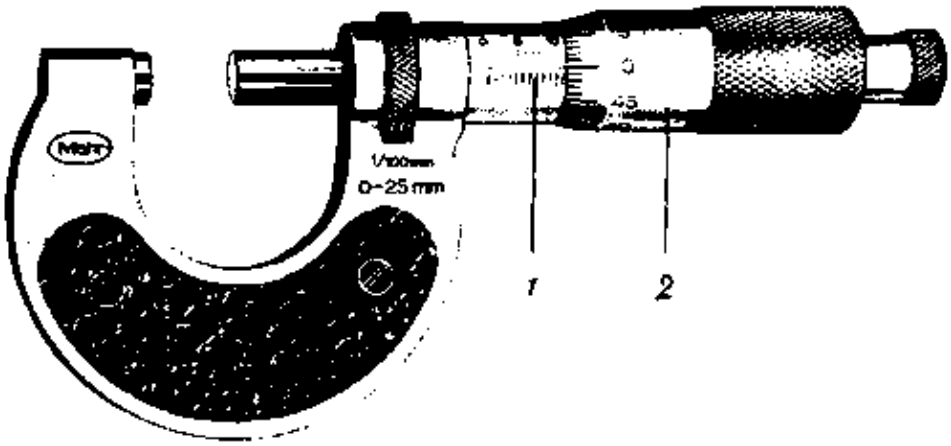
E. Measuring the depth of holes.



MC 4.2

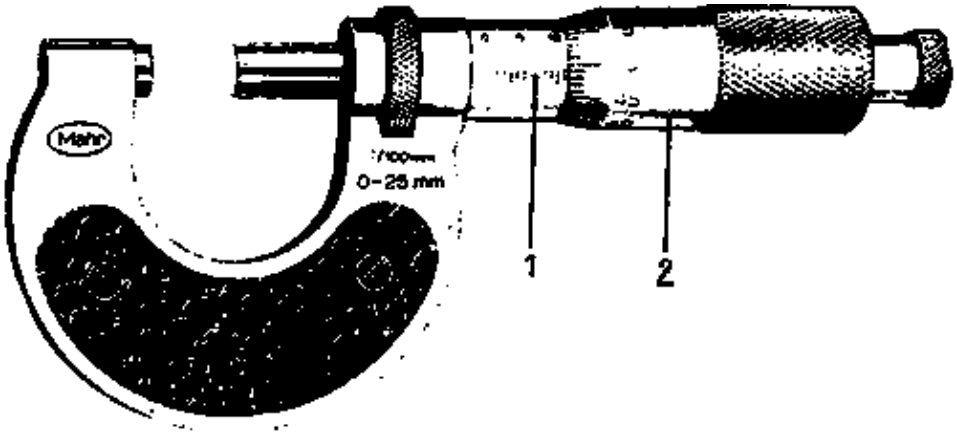
The smallest division on scale “1” is

A. 1 mm.
B. $\frac{1}{2}$mm.
C. $\frac{1}{10}$mm.
D. $\frac{1}{100}$mm.
E. $\frac{1}{1000}$mm.



MC 5.1

One division on scale “2” represents



A. 1 mm.
B. $\frac{1}{2}$mm.
C. $\frac{1}{5}$mm.
D. $\frac{1}{50}$mm.
E. $\frac{1}{100}$mm.

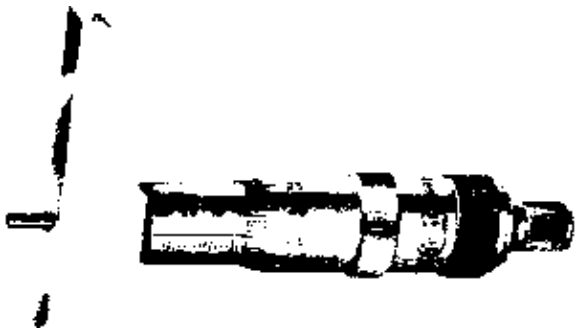
MC 5.2

What is the correct name for this measuring instrument?

A. Inside micrometer
B. Micrometer depth gauge
C. Mini micrometer
D. Ram micrometer
E. Keyway micrometer

MC 5.3

Which of the following measuring operations can be carried out with this micrometer?

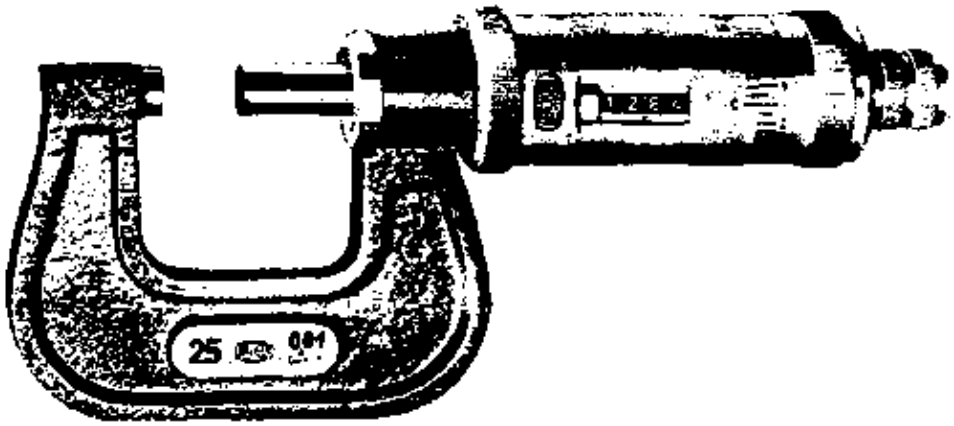


A. Measuring of centre distances.
B. Exact measuring of the thickness of sheets.
C. Measuring of the width of keyways.
D. Measuring of the depth of milled grooves.
E. Exact measuring of the tooth depth of gears.

MC 6.1

What is the meaning of the figure 0.01 on the frame of the micrometer?

A. A guaranteed accuracy of $\frac{1}{1000}$ mm at a temperature of 25°C.
B. The tolerance of the pitch of the spindle thread is 0.01 mm.
C. The measuring pressure must not exceed 0.01 N.
D. The smallest scale division on the thimble represents 0.01.



MC 6.2

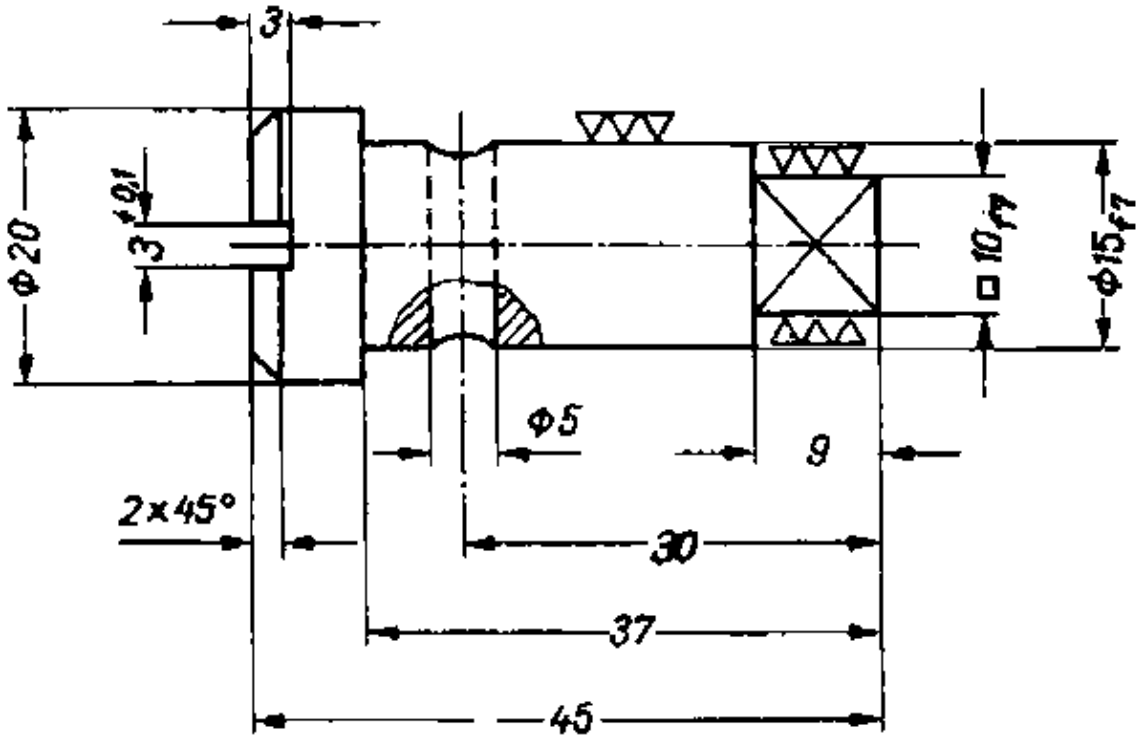
Which of the following measuring instruments allows for the most accurate measurement of the actual size?

A. Micrometer
B. Vernier caliper
C. Steel rule
D. Snap gauge
E. Limit plug gauge

MC 6.3

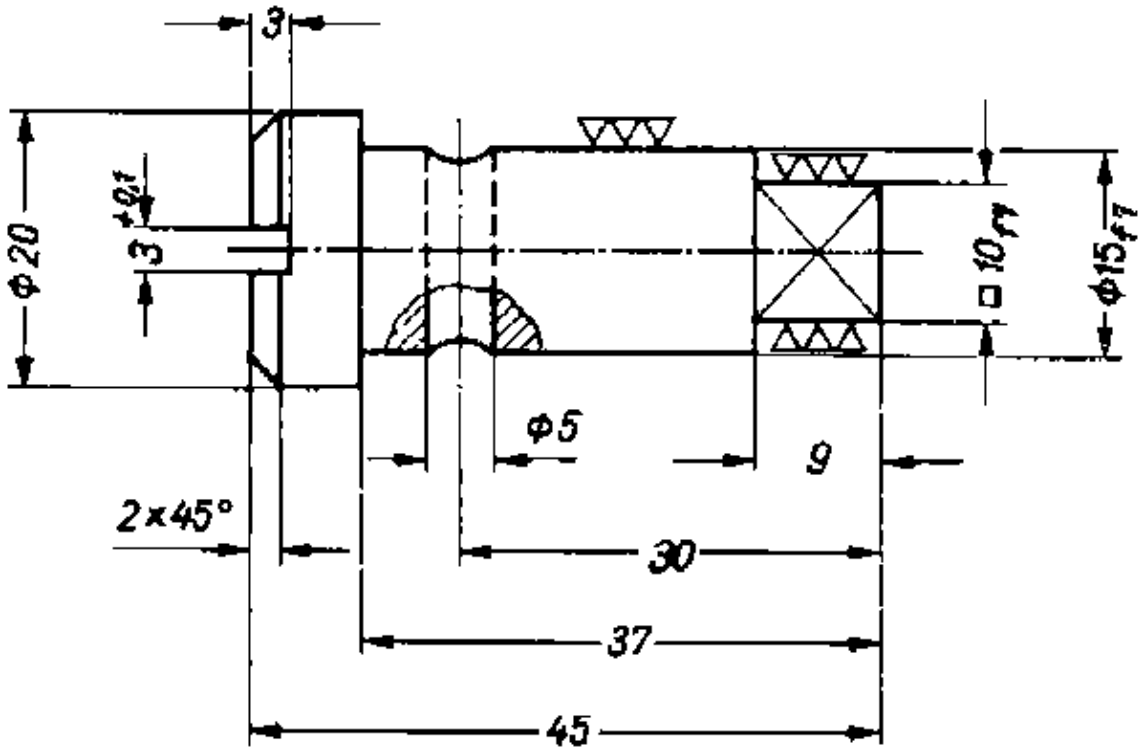
A workpiece has been produced according to the drawing below. Assuming the size '30' of this workpiece has to be checked, which of the following tools is most suitable for this purpose?

A. Outside caliper
B. Vernier caliper
C. Steel rule
D. Snap gauge
E. Depth gauge



MC 7.1

The accuracy of the angles of the square portion (□ 10_{f7}) shown below has to be checked. Which of the following tools is most suitable for this purpose?



A. Angle block
B. Bevelled edge try square
C. Bevel protractor
D. Centre square
E. Angle bevel

MC 7.2

For checking the dimension of a blindhole the limit plug gauge must have a longitudinal groove.

Which of the following is the reason for this?

A. That the air can escape out of the hole.

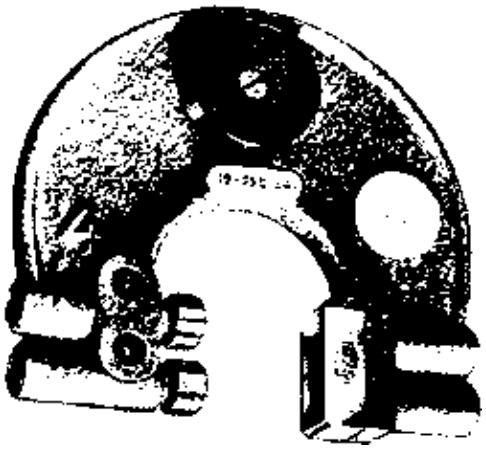
B. That small chips in the hole remain without influence on the accuracy of the measurement.

C. That the temperature difference between workpiece and plug gauge is without influence on the accuracy.

D. That the coolant can escape out of the hole.

MC 7.3

What is the correct name for this measuring instrument?

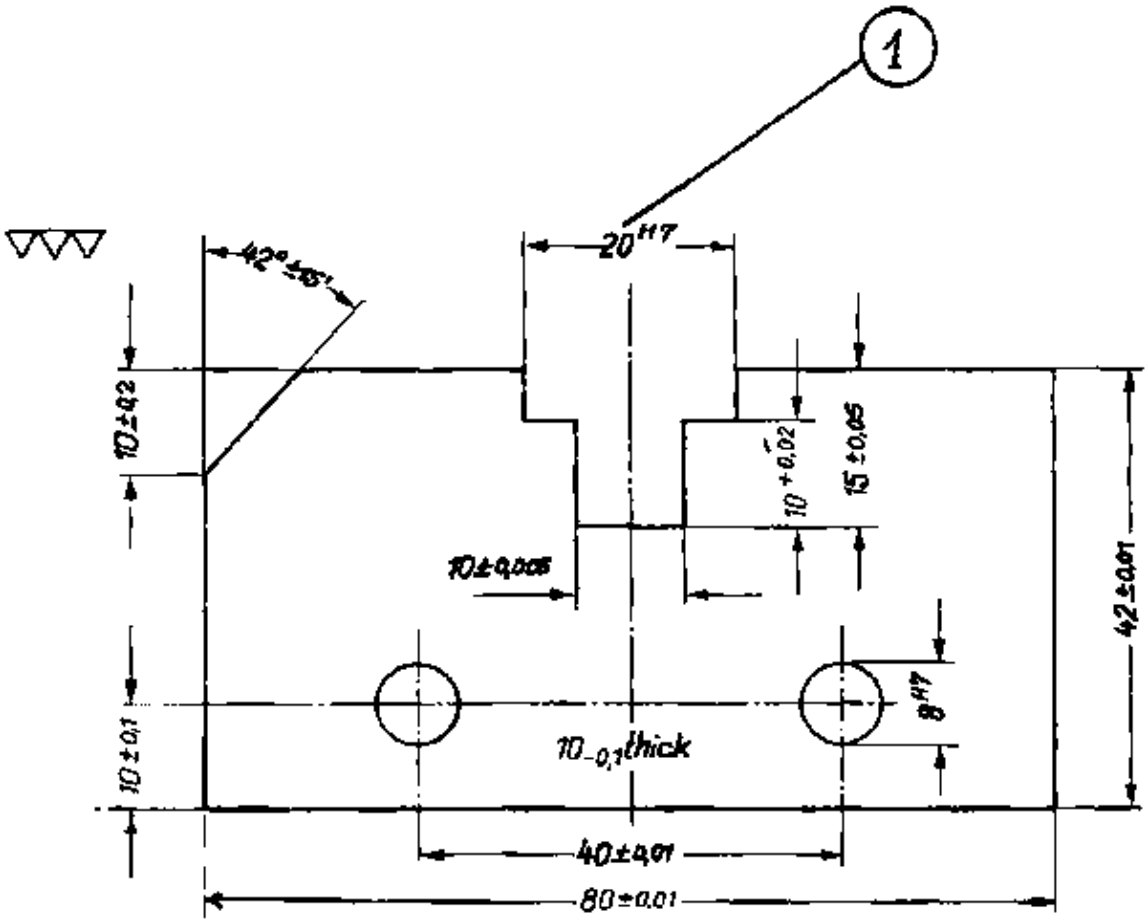


A. Flat gauge
B. Block gauge
C. High precision snap gauge
D. Adjustable type snap gauge

MC 8.1

A workpiece has been produced according to the drawing below. Which of the following tools is suitable for checking whether the actual size '1' of the groove is within the given tolerance?

A. Universal vernier caliper
B. Feeler gauge
C. Inside calipers
D. Dial indicator
E. Flat limit plug gauge



MC 8.2

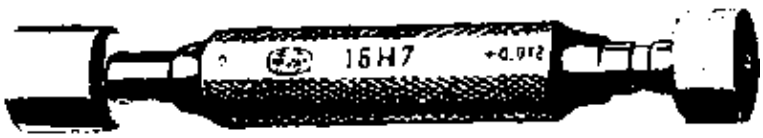
Which is the proper way of cleaning gauge blocks of steel after use?

A. They are rubbed with the palms of the hand.
B. They are rubbed with polishing material.
C. They are rubbed with the palms of the hand and subsequently covered with vaseline.
D. They are rubbed with soft leather and then given a layer of vaseline.
E. They are rubbed with a fat–solving fluid.

MC 8.3

What is the correct name for this checking instrument?

A. Measuring gauge
B. Measuring plug
C. Limit plug gauge
D. Feeler plug gauge

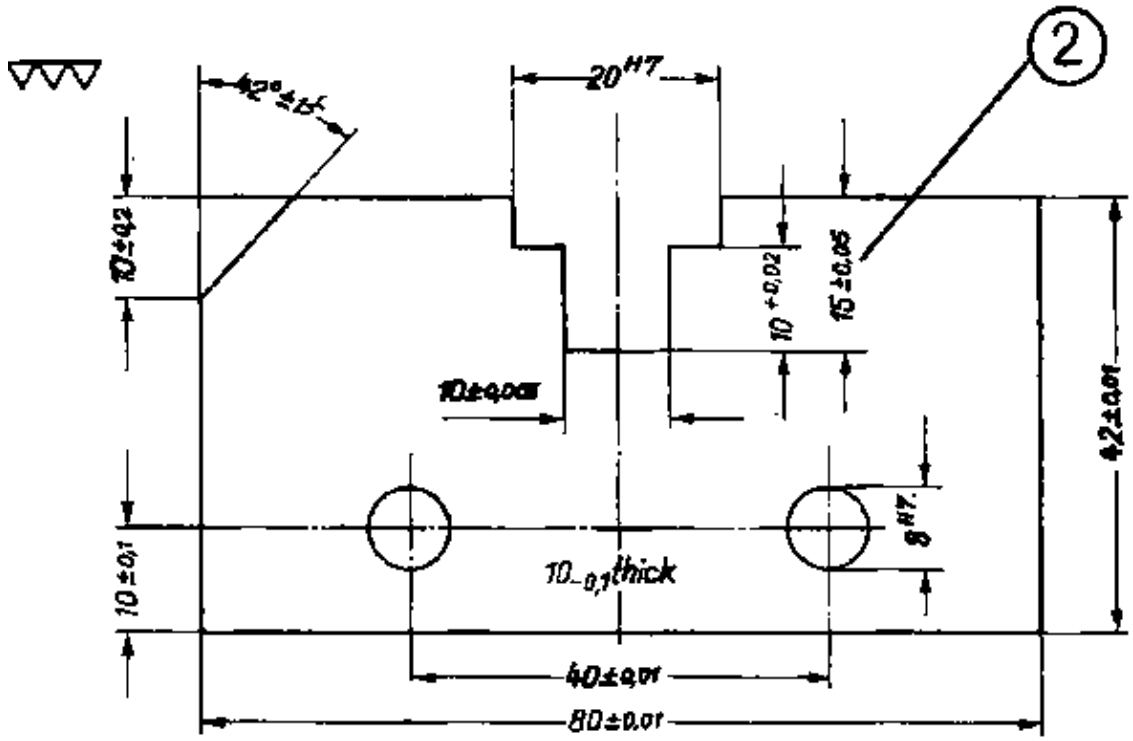


MC 9.1

The actual size '2' of the groove has to be found.
Which of the following tools is most suitable for this purpose?

A. Gauge blocks
B. Inside dial indicator
C. Micrometer depth gauge

D. Vernier depth gauge.
E. Inside calipers



MC 9.2

A limit plug gauge 50^{H7} had been lying in the sun for a long time. Will this affect the checking result?

A. Yes, because the sun destroys the protection films on the measuring surfaces.

B. No, plug limit gauges are not subject to thermal expansion.

C. Yes, the checked holes appear to be smaller.

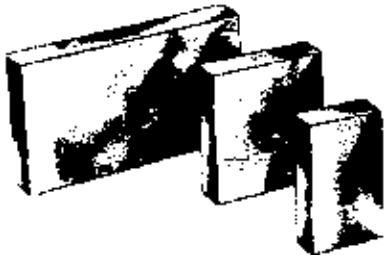
D. Yes, the checked holes appear to be bigger

E. No, the thermal expansion is so minor that it does not affect the checking result.

MC 9.3

What is the correct name for these checking instruments?

A. Measuring blocks
B. Limit gauges
C. Flat gauges
D. Gauge blocks
E. Flat limit gauges

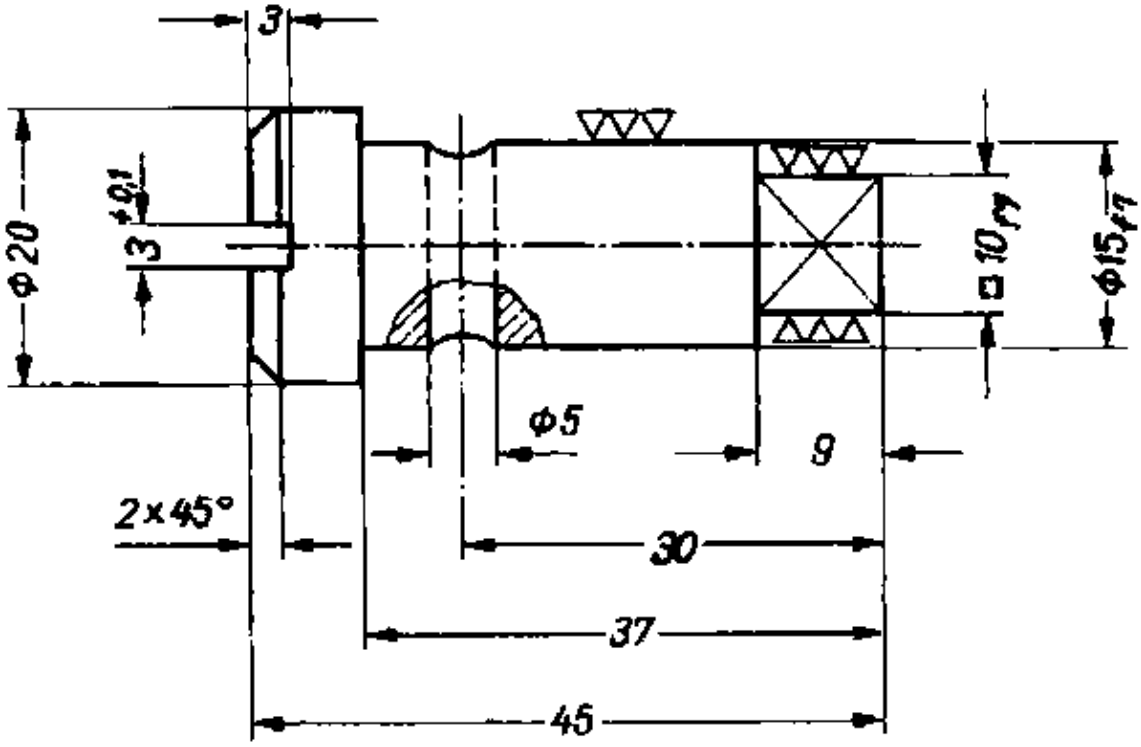


MC 10.1

The actual size of the dia ∅ 15_{f7} of the workpiece shown below has to be found out.

Which of the following tools is most suitable for this purpose?

A. Dial indicator
B. Outside calipers
C. Snap gauge
D. Vernier caliper
E. Micrometer



MC 10.2

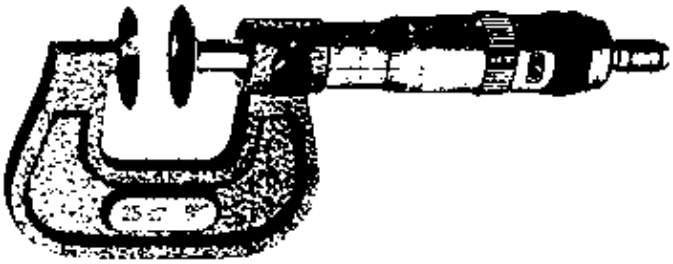
How much is the tolerance of the dimension $50^{+0.011}_{-0.005}$?

A. 0.005 mm
B. 0.011 mm
C. 0.016 mm
D. 0.05 mm
E. 0.16 mm

MC 10.3

For which of the following measuring operations is this micrometer particularly suitable?

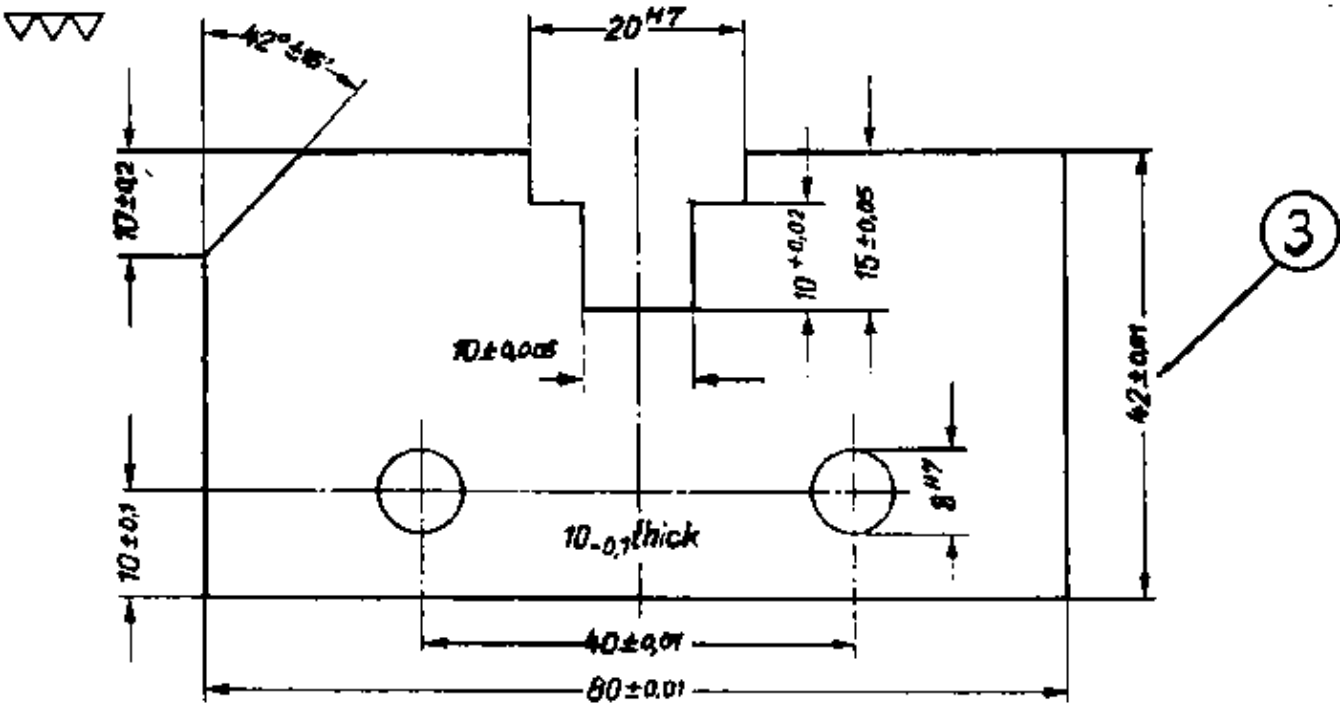
A. Measuring of round workpieces (disks).
B. Exact measuring of the thickness of sheet metal.
C. Exact measuring of the pitch of gears.
D. Measuring of circular steps.
E. Measuring of the thickness of balls.



MC 11.1

The actual width '3' of the workpiece has to be found.
Which of the following tools is most suitable for this purpose?

A. Snap gauge
B. Micrometer
C. Outside calipers
D. Vernier caliper
E. Steel rule



MC 11.2

The picture shows a section of the scale of a vernier caliper. What is the exact size of the job measured?

A. 4.4 mm
B. 44.0 mm
C. 5.3 mm
D. 44.4 mm
E. 53.0 mm

MC 11.3

The best way of checking a hole ∅ 10^{H7} is by using a

A. universal vernier caliper.
B. inside micrometer.
C. block gauge.
D. inside spring caliper.
E. plug gauge.

MC 11.4

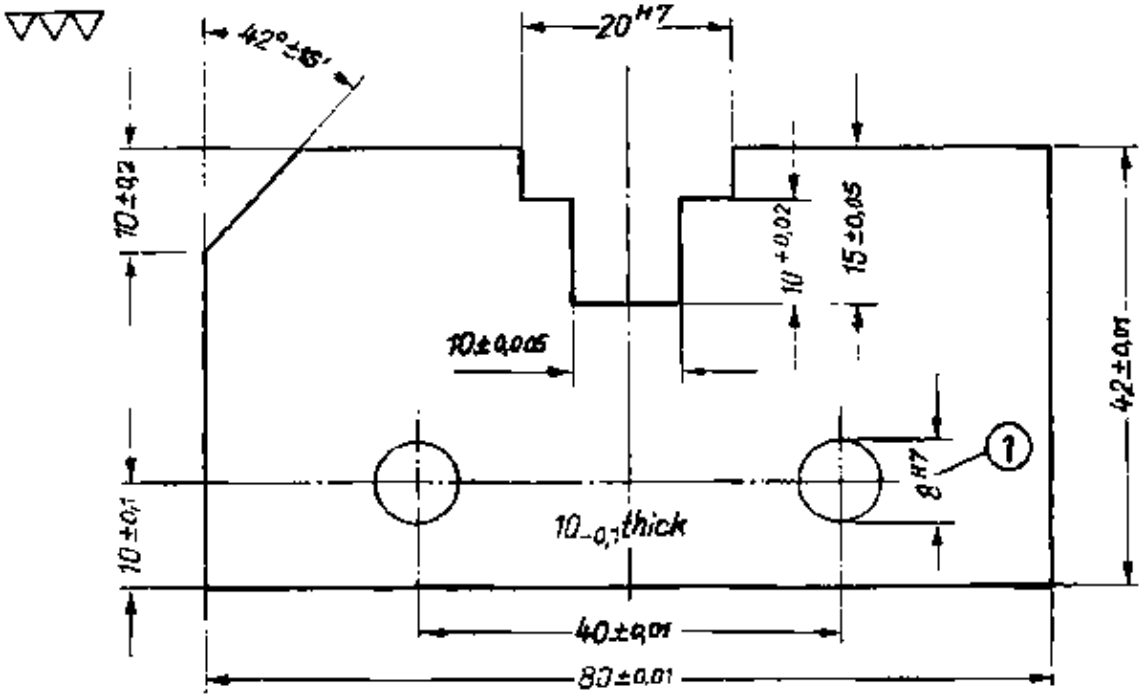
Indirect measuring is performed with a

A. vernier caliper.
B. protractor.
C. caliper.
D. micrometer.

MC 12.1

A workpiece has been produced according to the drawing below. Which of the following tools is best suited for checking whether the dia. '1' of the cylindrical holes is within the given tolerances?

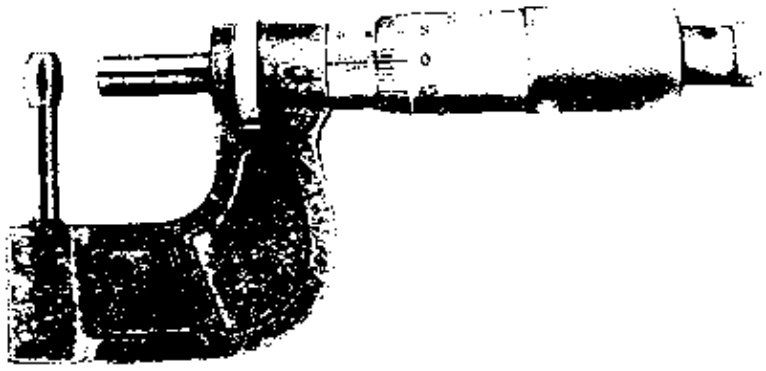
A. Vernier caliper
B. Ring gauge
C. Limit plug gauge
D. Inside calipers
E. Snap gauge



MC 12.2

For which of the following measuring operations is this micrometer particularly suitable?

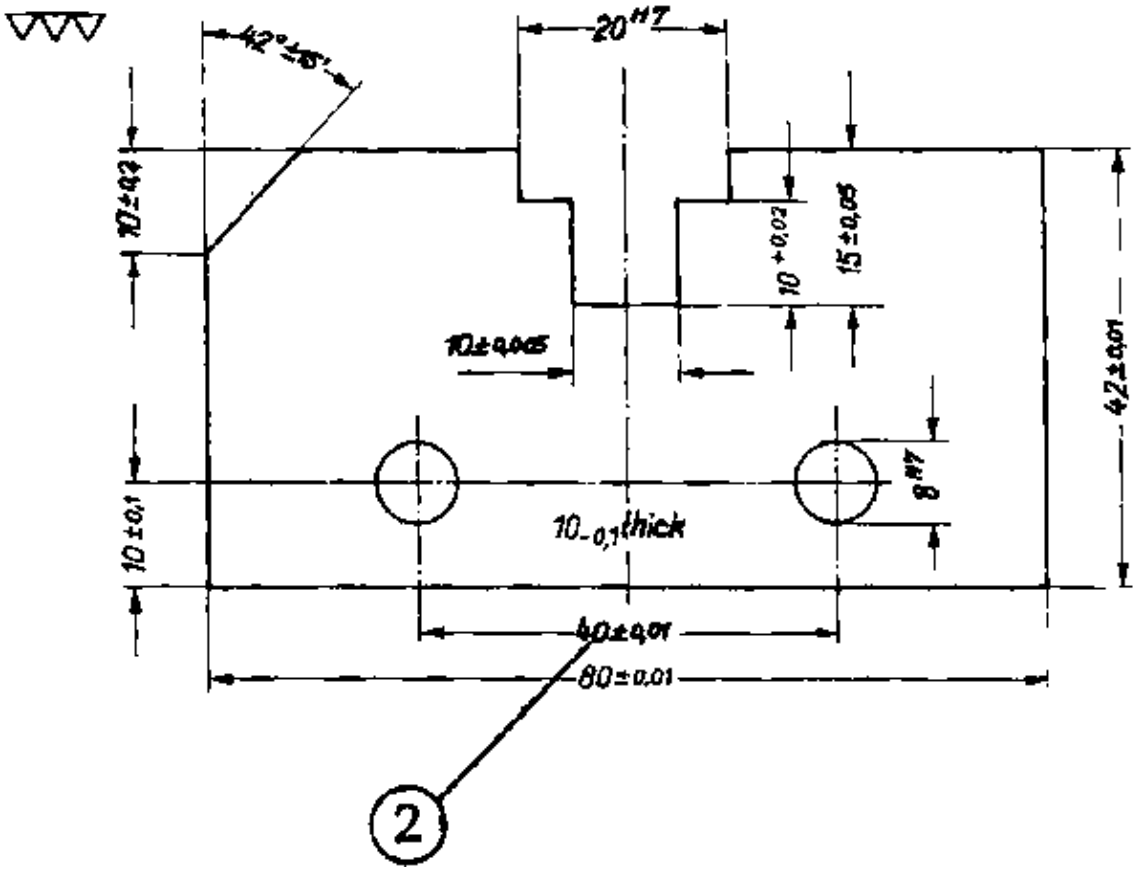
A. For measuring the thickness of sheet metal.
B. For measuring the centre distances of holes.
C. For measuring the distance of an internal recess from a surface.
D. For measuring the depths of round slots.
E. For measuring the wall thickness of pipes.



MC 13.1

The centre distance '2' of the two cylindrical holes has to be measured. Which of the following instruments are most suitable?

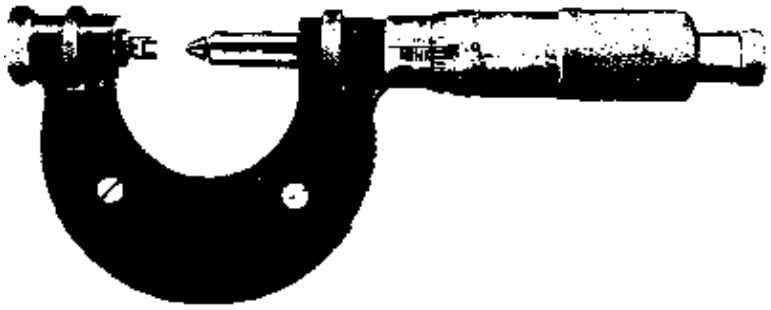
A. Two plug gauges and vernier caliper.
B. Two limit gauges and dial indicator.
C. One plug gauge and vernier caliper.
D. Two plug gauges and gauge blocks.
E. Limit plug gauge and feeler gauge.



MC 13.2

For which of the following measuring operations is this tool particularly suitable?

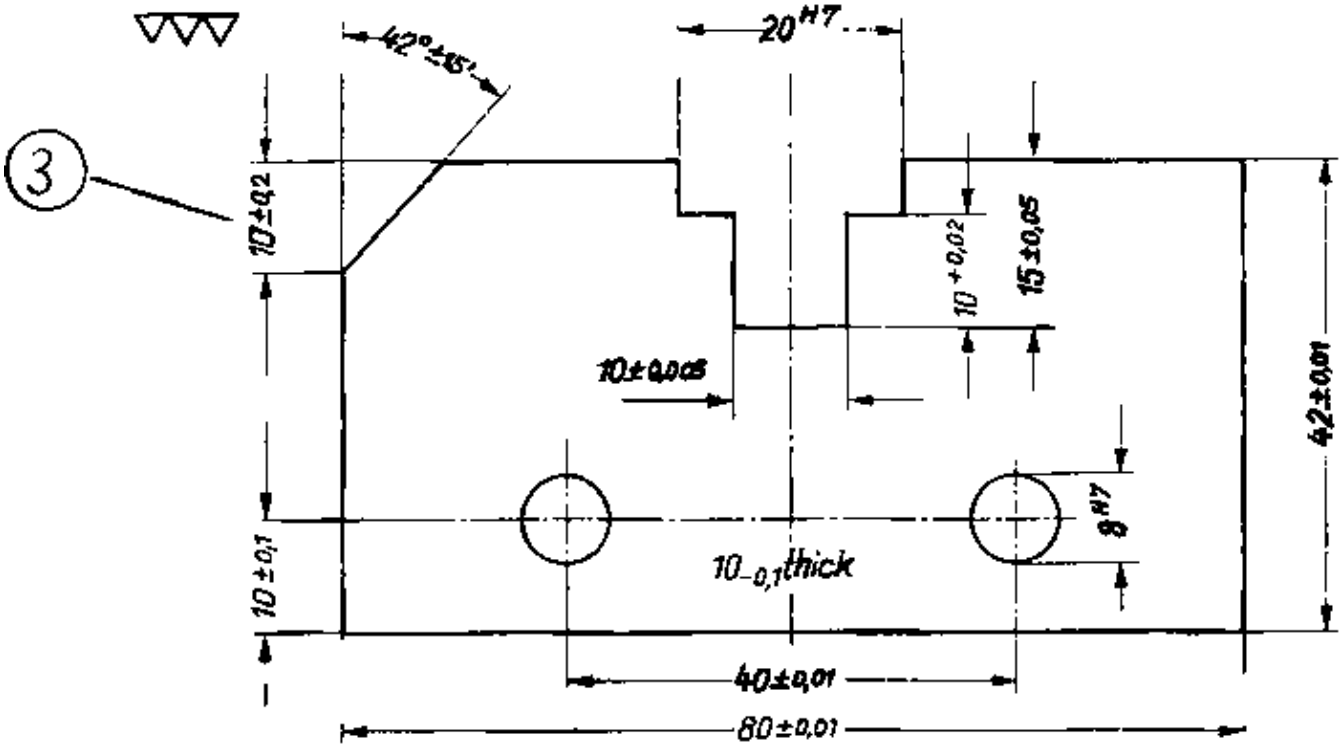
A. For measuring the thickness of wires.
B. For measuring exactly the pitch diameter of a thread.
C. For measuring the root diameter of small gears.
D. For measuring exactly the thickness of sheet metal.
E. For measuring the depth of tapped holes.



MC 14.1

The size '3' of the workpiece below has to be checked.
Which of the following tools is most suitable for this purpose?

A. Steel rule
B. Angle block
C. Vernier caliper
D. Outside caliper
E. Inside caliper



MC 14.2

When using too much force while measuring an outside diameter with a vernier caliper

A. the reading will be wrong.
B. the result of the reading can be too high.
C. the wear of the caliper will increase rapidly.
D. the accuracy of the caliper will decrease immediately.

MC 14.3

The decisive feature of gauging is that

A. it is the only procedure to find the actual size of the work piece.
B. the result of gauging is more accurate.
C. measuring demands less skill than gauging.

D. checking of the tolerated size of the work piece can be done by gauging.

MC 15.1

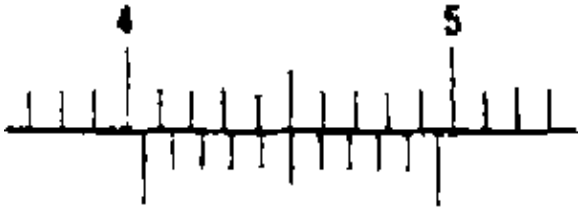
The accuracy of a vernier caliper with ten divisions over a 19 mm scale length is

A. 0.01 mm
B. 0.05 mm
C. 0.1 mm
D. 0.2 mm

MC 15.2

The picture shows a section of the scale of a vernier caliper. What is the exact size of the job measured?

A. 4.3 mm
B. 4.4 mm
C. 4.04 mm
D. 40.5 mm
E. 40.4 mm



MC 15.3

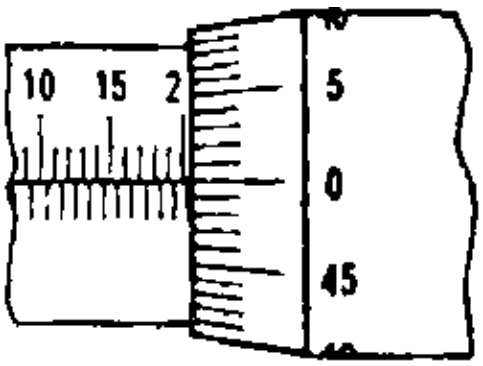
What influence has a warmed–up vernier caliper (heat of the hands, sun rays) on the measuring result?

A. No influence.
B. The measuring result becomes smaller than the actual length of the job.
C. The measuring result becomes bigger.
D. The ruler of the vernier caliper warps.

MC 15.4

The picture shows the section of a micrometer.
What is the exact size of the job measured in this example?

A. 19.50 mm
B. 20.00 mm
C. 20.05 mm
D. 20.50 mm
E. 21.00 mm



MC 15.5

A measuring accuracy up to 0.05 mm can be achieved with a vernier caliper when

A. 10 mm length is divided into 9 parts.
B. 20 mm length is divided into 19 parts.
C. 9 mm length is divided into 10 parts.
D. 19 mm length is divided into 20 parts
E. 19 mm length is divided into 10 parts.

MC 15.6

Suppose, a hole has the ISO–symbol H7.
Which small letters of the shaft would give you a clearance fit?

A. a to h
B. i to k
C. m to n
D. p to z

MC 16.1

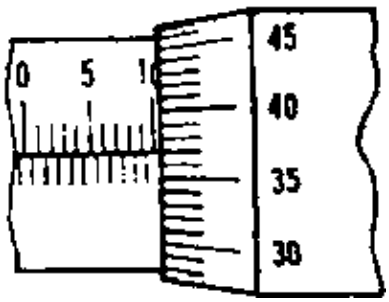
A disadvantage of gauging is that

A. it takes a longer time than measuring to get the result.
B. the accuracy is lower than that of vernier calipers.
C. one set can only be used for one tolerance.
D. there are more possibilities for making mistakes.

MC 16.2

The picture shows a section of a micrometer.
Which is the exact size of the job measured in this example?

A. 10.034 mm
B. 10.34 mm
C. 10.87 mm
D. 11.037 mm
E. 10.37 ram



MC 16.3

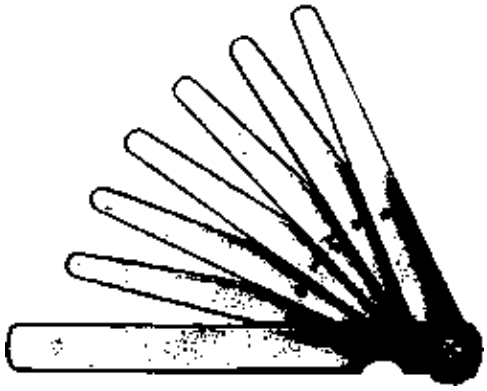
For gauging a bolt we use a

A. snap gauge.
B. plug gauge.
C. caliper gauge.
D. height gauge.

MC 16.4

For which checking operation is this tool suitable?

A. Checking of radii.
B. Measuring the thickness of sheet metal.
C. Testing of tooth–pitch.
D. Checking the clearance
E. Testing the pitch of acme threads.



MC 16.5

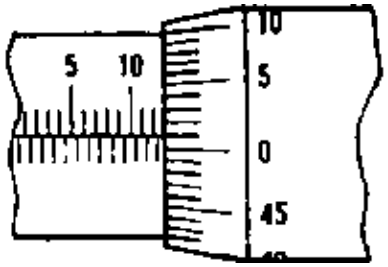
The universal bevel protractor has an auxiliary (vernier) scale. By this scale the accuracy of reading is increased to

A. 1°
B. 10°
C. 0.1°
D. 5'

MC 17.1

The picture shows a section of a micrometer.
What is the exact size of the job measured in this example?

A. 10.31 mm
B. 13.01 mm
C. 14.01 mm
D. 10.51 mm
E. 13.51 mm



MC 17.2

A vernier caliper with an accuracy of 1/10 mm has a vernier scale

A. with 10 divisions over 19 ram scale length.
B. with 9 divisions over 10 mm scale length.
C. with 19 mm length over 20 divisions on the main scale.
D. with 9 mm length coinciding with 10 divisions on the main scale.

MC 17.3

What is the proper way of testing the envenness of a surface with this instrument?

A. The tool is inclined backward, slightly pressed and drawn over the surface.
B. Under great pressure the tool is shifted in the direction of the edge.
C. Under light pressure the tool is shifted in circular direction over the surface.
D. At several spots the tool is set on the surface at a right angle

MC 17.4

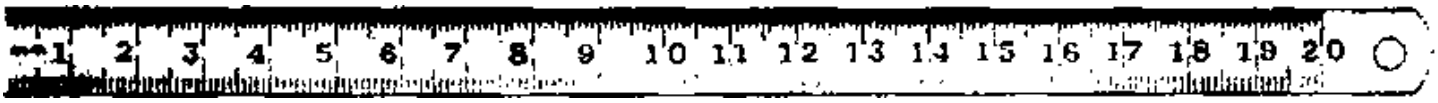
For an accuracy of 1/100 mm and 50 divisions on the thimble the pitch of the spindle of the micrometer has to be

A. 1 mm
B. 2 mm
C. 0.5 mm
D. 0.1 mm

MC 18.1

What is the reading accuracy of this measuring tool?

A. 0.1 nun
B. 0.25 mm
C. 0.5 mm
D. 1 mm
E. 2 mm



MC 18.2

The picture shows a section of the scale of a vernier caliper. What is the exact size of the job measured?

A. 4.5 mm
B. 13.4 mm
C. 4.4 mm
D. 4.3 mm
E. 0.44 mm

MC 18.3

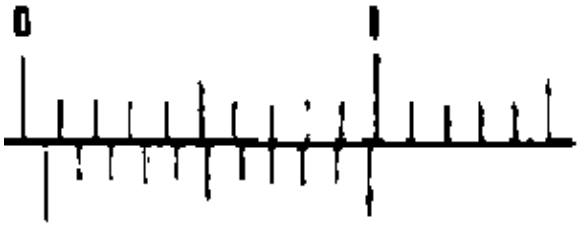
Tolerance is

A. the difference between actual size of the work and the top limit.
B. the possible measuring accuracy limited by the measuring instruments.
C. the difference between maximum size and minimum size.
D. the tolerated actual size when measured after shaping.

MC 18.4

The pictures shows a section of the scale of a vernier caliper. What is the exact size of the job measured?

A. 0.7 mm
B. 0.8 mm
C. 0.9 mm
D. 1.7 mm
E. 10.7 mm



MC 18.5

The picture shows a section of a micrometer.
What is the exact size of the job measured in this example?

A. 15.12 mm
B. 15.70 mm
C. 16.02 mm
D. 16.20 mm
E. 16.70 mm