1. The size of an engineer's vice is specified by the
   (1) length of the movable jaw
   (2) width of the jaws
   (3) height of the vice
   (4) maximum opening of the jaws
   Ans: 2

2. Scribers are made of
   (1) mild steel (2) high carbon steel
   (3) brass (4) cast iron
   Ans: 2

3. The distance which the cutting edge of a tool passes over the material in a minute while machining is known as
   (1) RPM (2) Feed
   (3) Machine speed (4) Cutting speed
   Ans: 2

4. While using a Vernier height gauge, the jobs are generally
   (1)held by hand (2) supported by angle plates
   (3) supported by another work piece (4) supported by parallel bars
   Ans: 2

5. Elementary gases like hydrogen, oxygen and nitrogen are
   (1) Triatomic gases (2) Diatomic gases
   (3) Monoatomic gases (4) Polyatomic gases
   Ans: 2

6. Drill chucks are fitted on the drilling machine spindle by means of a
   (1) knurled ring (2) arbor
   (3) drift (4) pinion and key
   Ans: 3

7. The nut used in the hand vice is named as a
   (1) thumb nut (2) cap nut
   (3) wing nut (4) chuck nut
   Ans: 3

8. A screw ring gauge is used for checking
   (1) internal threads (2) external threads
   (3) dies and taps (4) major diameter
   Ans: 2

9. X-rays/γ-rays carry
   (1) Positive charge (2) negative charge
   (3) No charge (4) positive and negative charges
   Ans: 3

10. The thickness of the cotter as compared to the width is
(1) Half (2) two times (3) one fourth (4) one third
Ans:3

11. Which of the following factors has maximum influence on tool life?
(1) Shape and angle of tool (2) tool material
(3) Cutting speed (4) nature of coolant
Ans: 3

BOX 1:TAYLOR TOOL LIFE EQUATION

TAYLOR TOOL LIFE EQUATION

It is observed that the higher cutting speed shorter the tool life. This relationship between cutting speed and tool life is given by Taylor formula. This formula gives fairly good results. Tylor equation is restricted to very narrow range of cutting process parameter because this equation does not take all affecting parameter into consideration.

$VT^n = C$

where
V = Cutting speed in meter/ minute

T = Tool life in minutes

n = an index related to cutting tool material

for high speed steel tools, n= 0.1 to 0.5

for tungsten carbide tools, n= 0.2 to 0.4

for ceramic tools, n= 0.4 to 0.6

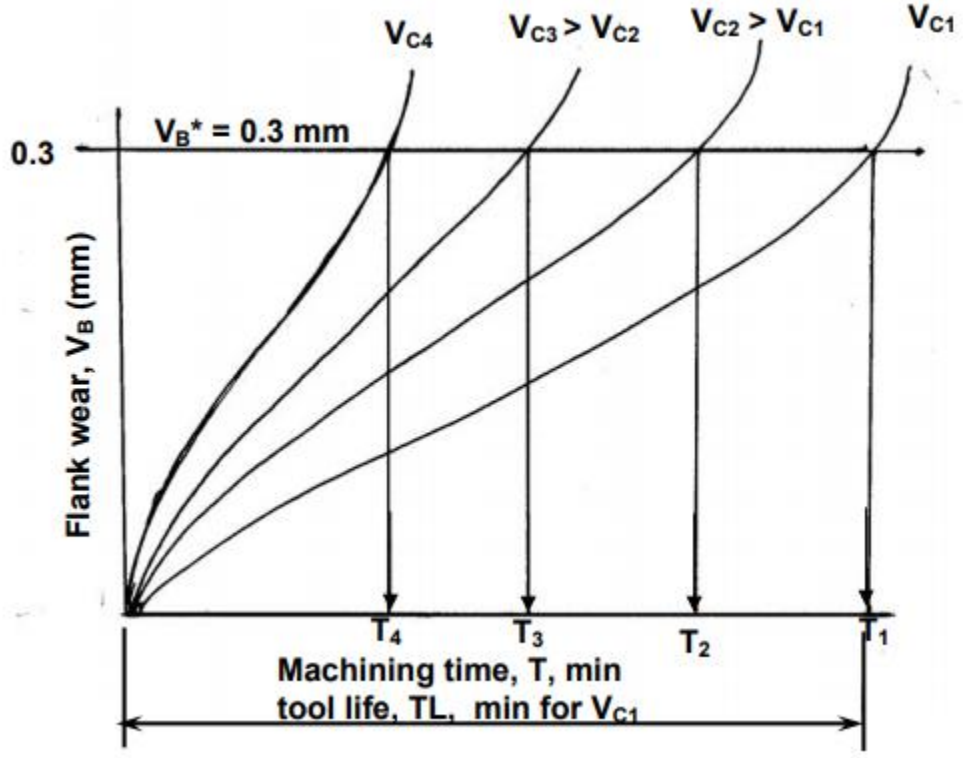
C = a constant. It is numerically equal to the cutting speed that gives tool life of one minute (C = $V*1^n = V$)
https://www.mecholic.com/2018/11/taylor-formula-for-tool-life.html

BOX2:TAYLOR TOOL LIFE EQUATION

Taylor's tool life equation,
$VT^n = C$

where, n is called, Taylor's tool life exponent. The values of both 'n' and 'c' depend mainly upon the tool-work materials and the cutting environment (cutting fluid application). T

Wear and hence tool life of any tool for any work material is governed mainly by the level of the machining parameters, i.e., cutting velocity,(Vc, feed, (soso) and depth of cut (t). cutting velocity affects maximum and depth of cut minimum. The usual pattern of growth of cutting tool wear (mainly VBVB), principle o assessing tool life and its dependence on cutting velocity are schematically shown in Fig.1.



The tool life obviously decreases with the increase in cutting velocity keeping other condition's unaltered as indicated in Fig.1.

https://nptel.ac.in/content/storage2/courses/112105127/pdf/LM-14.pdf

12. While cutting small diameter pipes, it is advisable to watch regularly and ensure that
(1) the cut is along the curved line
(2) more saw teeth are in contact
(3) work is not overheated
(4) proper balancing of backsaw is maintained
Ans: 2

13. Chips are to be removed from the lathe by

(1) hand (2) metal wire brush (3)cotton waste (4) a piece of cloth
Ans: 2

14. In thermit welding the high temperature is produced by
(1) an electric arc
(2) an exothermic chemical reaction
(3) the combustion of oxygen and acetylene
(4) none of the above
Ans: 2

THERMIT WELDING

When applied to the reduction of Iron oxides, the exothermic reaction generates sufficient energy to raise the reaction product temperature to in excess of 3,000°C at which both the metal and aluminium oxide are both liquid:

Iron Oxide	+	Aluminium	>	Aluminium Oxide	+	Iron	+	Heat
3FeO	+	2Al	>	Al_2O_3	+	3Fe	+	880 kJ
Fe_2O_3	+	2Al	>	Al_2O_3	+	2Fe	+	850 kJ

http://www.railsystem.net/thermit-welding/

15. Washers help to
(1) improve appearance
(2) distribute force over a larger area
(3) distribute force to the bolt
(4) cover the clearance hole of the work piece
Ans: 2

Washer, a machine component that is used in conjunction with a screw fastener such as a bolt and nut and that usually serves either to keep the screw from loosening or to distribute the load from the nut or bolt head over a larger area. They distribute the pressure and prevent the fastener from moving or corroding. For load distribution, thin flat rings of soft steel are usual. To prevent loosening, several other types of washers are used.

16. The function of a radiator is to
(1) cool the lubricating oil
(2) cool the hot water from the engine jacket
(3) supply air for cooling

(4) filter water used for cooling
Ans: 2

17. The use of compressor is not required
(1) Vapour compression system (2) Bell Coleman refrigerator
(3) Vapour absorption system (4) Air refrigeration system
Ans: 3

18. The kinetic energy possessed by the body is due to its
(1) position
(2) motion
(3) chemical reaction with other substances
(4) none of the three are correct
Ans: 2

19. The material used for manufacture of cylinder block is
(1) Stainless steel (2) Grey cast iron
(3) Copper (4) Bronze
Ans: 2

20. The coolant used in a nuclear power plant is
(1) Heavy water (2) Freon
(3) Carbon dioxide (4) Sulphur dioxide
Ans: 1

21. The body which absorbs all radiation incident upon it is called as
(1) Black body (2) Opaque body
(3) White body (4) Transparent body
Ans: 1

22. A beam having more than two supports is called as
(1) fixed beam (2) overhanging beam
(3) continuous beam (4) simply supported beam
Ans: 3

23. Best insulation among the following is
(1) Copper (2) Aluminium (3) Iron (4) Mica
Ans: 4

24. In an automobile when the dynamo voltage is more than the battery voltage , the voltage flow to the
(1) field winding (2) shunt winding
(3) series winding (4) armature winding
Ans: 4

25. Brass is an alloy of
(1) Copper and tin (2) Copper and zinc
(3) Copper and lead (4) Copper and aluminium
Ans: 2

26. The solder used for soldering the battery cables is made of

(1) tin and lead (2) copper and tin
(3) lead and aluminium (4) copper and zinc
Ans: 1

27. The electrolyte used in lead acid battery is
(1) Nitric acid (2) Citric acid
(3) Sulfuric acid (4) Hydrochloric acid
Ans: 3

28. Identify the metal which is a good conductor of heat and electricity
(1) Zinc (2) Lead
(3) Tin (4) copper
Ans: 4

29. Cast iron is normally machined/turned
(1) by applying soluble oil as a coolant
(2) dry
(3) by applying kerosene as a coolant
(4) by applying water as a coolant
Ans: 2

30. The external threads on GI pipes are cut easily by
(1) Tap sets (2) dies and die stocks
(3) Centre lathes (4) thread rollers
Ans: 2

31. For joining thin material to thick material, the rivet used is
(1) Counter sink head (2) snap head
(3) Flat head (4) round head
Ans: 2

FASTENERS FOR SHEET METAL

There are several types of fasteners used to join pieces of sheet metal and to attach sheet metal to other materials.

RIVETS

Before modern welding techniques came into common use, riveting was one of the most common methods for joiing sheet metal.

TINMAN'S RIVETS

They are small flat headed rivets with relatively short lengths. The size number of tinman's rivets are determined by the approximate weight per thousand rivets. Each weight of rivet has a definite diameter and length.

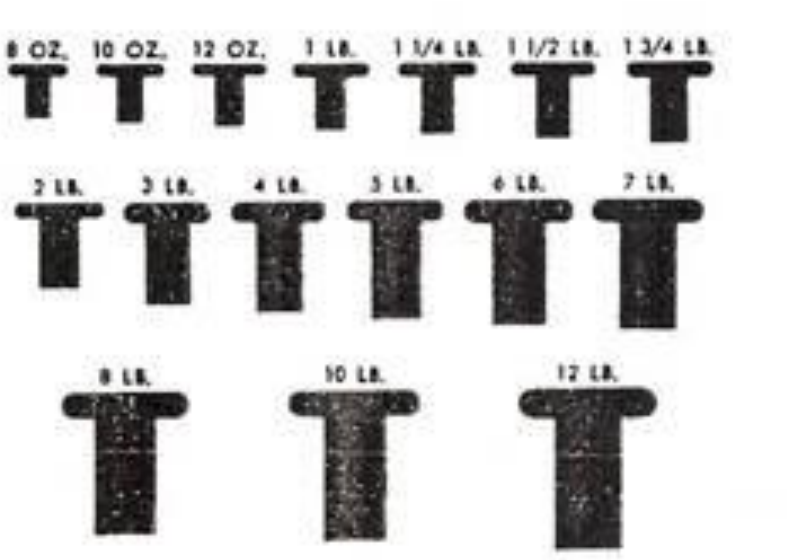


Figure - Tinman's Rivets

Riveting

Riveting may be done by hand or by machine. When the job is performed by hand, as is usually the case in sheet metal work, it is done with a hammer and rivet set.

TYPES OF RIVETS

Many types of rivets are used in the sheet metal shop. The most common types are the tinman's rivets, flathead, snap head (also called roundhead) and pop rivets. The countersunk is used where a flush surface is desired, and the snaphead when exceptional strength is required.

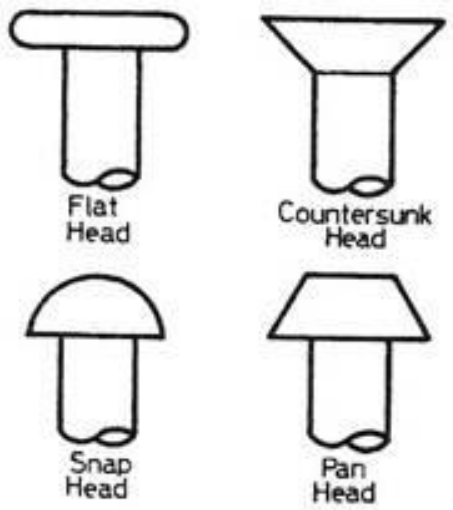


Figure: Types of Rivets

http://www.summaryplanet.com/engineering/Fasteners-for-Sheet-Metal.html

32. Piston rings are generally made of
(1) Cast iron (2) Brass (3) Copper (4) Aluminium
Ans: 1 (Grey modified cast iron)

ADVANCED AND CONVENTIONAL INTERNAL COMBUSTION ENGINE MATERIALS

L.L. Myagkov, ... I. Makhkamova, in Alternative Fuels and Advanced Vehicle Technologies for Improved Environmental Performance, 2014

PISTON RINGS

Piston rings are usually made of cast iron or steel. Wear resistance is an important requirement in the materials used for their manufacture. The material should also have a low friction coefficient to enable the rings to slide along the cylinder's surface and should be able to withstand high pressures at various temperatures under limited lubrication conditions. It should not be prone to seizing when rings are moving in contact with a cylinder and should have a high modulus of elasticity (to provide the required specific pressure upon a cylinder's surface), high yield strength and hardness. Grey modified cast iron meets the above requirements.

FUNDAMENTALS OF LUBRICATION AND FRICTION OF PISTON RING CONTACT

V. D'Agostino, A. Senatore, in Tribology and Dynamics of Engine and Powertrain, 2010

Function

The piston ring-pack exhibits a complex dynamic behaviour, which includes gas and oil flows, twisting motion of each ring and its influence on ring-liner and ring-groove lubrication and contact, as well as unsteady oil supply. In modern automotive engines, the dynamics result in a significant share of the total friction power loss and plays a crucial role in the piston assembly response in terms of blowbye gas escape, wear and oil consumption

THE PISTON RING

Hiroshi Yamagata, in The Science and Technology of Materials in Automotive Engines, 2005

The piston ring is essentially a seal with a spring-like property. Similar rings are also used in other piston and cylinder mechanisms, such as compressors or hydraulic devices. The piston ring of an internal combustion engine must be designed with sufficient heat resistance to withstand exposure to high-temperature gas. The single-piece metallic piston ring with self tension, which is generally used in internal combustion engines, was first invented by J. Ramsbottom in 1854.

https://www.sciencedirect.com/topics/chemistry/piston-ring

33. Low engine oil pressure may be due to
(1) Clogged oil filter
(2) More oil filled in the oil sump
(3) High viscosity of oil used
(4) Excessive backlash between pump gears
Ans: 3

34. The valve used to control flow is the
(1) globe valve (2) gate (rising stem) valve
(3) check valve (4) gate (non-rising stem) valve
Ans: 1

A control valve is a power operated device capable of modulating flow at varying degrees between minimal flow and full capacity in response to a signal from the controlling system. Control valves may be broadly classified by their function as "on-off" type or "flow regulating" type. A control valve is comprised of an actuator mechanism that is capable of changing the position of flow controlling element in the valve. The valve modulates flow through movement of a valve plug in relation to the port(s) located within the valve body. The valve plug is attached to a valve stem, which, in turn, is connected to the actuator. The actuator, which can be pneumatically or electrically operated, directs the movement of the stem as dictated by the external control device. The actuator responds to an external signal which usually comes from a controller. The controller and valve together form a basic control loop. There are many types of valves available, each having their advantages and limitations. The basic requirements and selection depend on their ability to perform specific

Basic Valve Types

Valves are available with a wide variety of valve bodies in various styles, materials, connections and sizes. Selection is primarily dependent on the service conditions, the task, and the load characteristics of the application. The most common types are ball valves, butterfly valves, globe valves, and gate valves.

https://www.cedengineering.com/userfiles/Control%20Valves%20Basics%20-%20Sizing%20&%20Selection.pdf

35. The purpose of shock absorber in a vehicle is
(1) to receive shocks during breaking
(2) to reduce bouncing of wheels on bumps and pot holes
(3) to receive shocks during driving
(4) to stop lateral movement of spring when brake is applied
Ans: 2

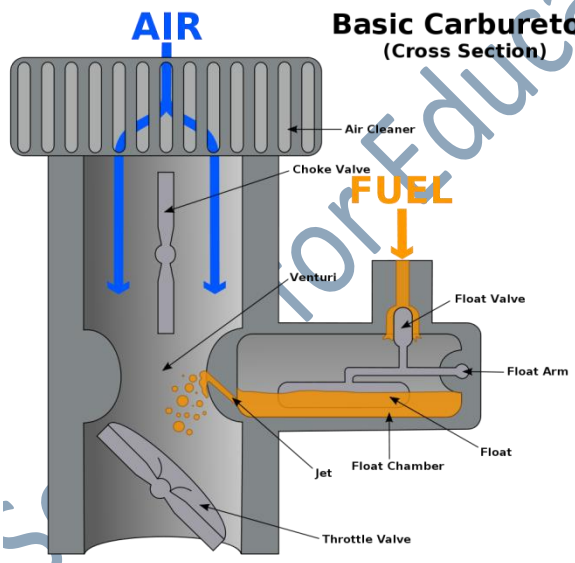
36. The choke in the carburetor is generally used

(1) when the engine is idling
(2) when the engine is running at high speed
(3) when the engine is to be suddenly accelerated
(4) when the engine is to be cold started
Ans: 4

36.1 The choke in an automobile meant is for supplying rich mixture……...

Choke valves are generally used in naturally aspirated engines with carburetors to **supply a richer fuel mixture when starting the engine**. Most choke valves in engines are butterfly valves mounted in the manifold upstream from the carburetor jet to produce a higher partial vacuum, which increases the fuel draw.

Cross-sectional schematic of a basic carburetor, showing the choke valve at top



https://en.wikipedia.org/wiki/Choke_valve#/media/File:Carburetor.svgThe original uploader was K. Aainsqatsi at English Wikipedia.

37. Identify the vice used to hold works which are too small to be held with bolt and strap clamps
(1) precision vice (2) universal vice
(3) hand vice (4) quick releasing vice
Ans: 1

38. Collapsible tubes are produced by
(1) curling (2) coining
(3) extrusion (4) embosing
Ans: 3

39. In plain bush bearing, to prevent rotation of bush in the housing it should be fitted by means of
(1) soldering (2) key or screw
(3) brazing (4) welding
Ans: 2

40. The capacity of a battery is given in terms of
(1) ampere-hour (2) weight of battery
(3) voltage (4) volume of electff
Ans: 1

41. The machine used to locate and produce holes accurately is called
(1) Radial drilling machine (2) Broaching machine
(3) Jig boring machine (4) Internal grinding machine
Ans: 3

42. The type of jig in which a base plate is not available is the
(1) template jig (2) box jig
(3) trunnion jig (4) latch jig
Ans: 1

https://bharatskills.gov.in/pdf/Question_Bank/Fitter4thsemNSQF.pdf

43. The brittle form of steel is
(1) tempered steel (2) mild steel
(3) hardened steel (4) medium steel
Ans: 3

44. Balls are rollers are used for precision measurement because
(1) they are rigid (2) they are precision-finished
(3) they provide line or point contact (4) they can be produced easily
Ans: 3

45. A jig is a special device
(1) which holds the job
(2) which locates the cutting tool
(3) which guides the tool
(4) which hold, supports, locates the work piece and also guides the cutting tool
Ans: 4

46. The difference in reading between the minor and major load is taken into account in
(1) Brinnel hardness test (2) Shore method test
(3) Rockwell hardness test (4) Vicker hardness test
Ans: 3

47. A sine bar is made of

(1) High carbon steel (2) High speed steel
(3) Nickel steel (4) Stabilized chromium steel
Ans: 4

48. The abrasive used for honing of non-ferrous metals is
(1) Boron carbide (2) Diamond
(3) Silicon carbide (4) Aluminim oxide
Ans: 3

Silicon Carbide is mainly used on hard and brittle materials e.g. grey cast iron, tungsten carbide and non-ferrous metals.

http://www.ptp-tech.com/downloads/Atlantic%20Honing%20stones.pdf

49. The sensitiveness of the spirit level depends upon the
(1) size of the bubble (2) length of the glass tube
(3) type of liquid filled in the glass tube (4) curvature of the glass tube
Ans: 4

50. The standard pipe fitting s are provided with threads confirming with
(1) BA (2)BSW (3) BSP (4) Metric
Ans: 3