

1. The property of material which enables it to be drawn into wires is called?
(1) Ductility (2) Plasticity (3) Malleability (4) Toughness

Ans:(1)

- 2.1 The property of material which enables it to be drawn into plates/sheets is called?
(1) Ductility (2) Plasticity (3) Malleability (4) Toughness

Ans:(3)

3. When two cells, each of 12V, are connected in parallel, the voltage across them is ----
-----V.
(1) 12 (2) 24 (3) 6 (4) 10

Ans:(1)

- 3.1 In a lead acid cell/ battery, the electrolyte used is:
(1) Dilute Sulphuric acid (2) Nitric acid (3) Hydrochloric acid (4) None

Ans:(1)

4. A commutator is provided in a DC generator
(1) To convert induced alternating voltage in unidirectional pulse.
(2) To boost output voltage
(3) To prevent sparking
(4) None of the above

Ans:(1)

5. Which of the following cannot convert AC to DC?
(1) Diode (2) Mercury arc rectifier
(3) Converter (4) Transformer

6. Large size bolt heads are made by
(a) Hammering (b) Casting (c) Roll forging (d) Upset forging

Ans:(d)

- 6.1 Drop forging is done by dropping
(a) The work piece at high velocity (b) The hammer at high velocity
(c) The die with hammer at high velocity (d) Hammer with drop weight

Ans:(d)

7. 100 ton press means
(a) Gross weight of the press is 100 tons

- (b) Weight of the ram is 100 tons
- (c) Pressure exerted by the slide is 100 tons
- (d) Flywheel of the press weighs 100 tons

Ans:(c)

Note: Press is device, which generates compressive force.
20tonne means 20 tonne force=20000Kgf

8. Spring steel should have high resistance to
- (a) Shocks
 - (b) Fatigue
 - (c) Resilience
 - (d) Deformation

Ans:(a, b and c)

The selection of materials to use in the design and fabrication of springs relies on an understanding of the tensile and yield strengths of the various alloyed metals. These materials include high-carbon spring steels, alloy spring steels, stainless spring steels, copper-based spring alloys, and nickel-based spring alloys.

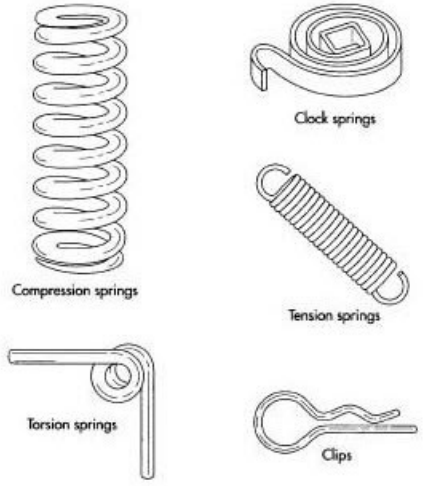
PROPERTIES OF SPRING STEEL

Spring steel is known to be resilient and pliable with a high yield strength. It has the unique ability to be formed, shaped, and post heat treated. These physical characteristics are what allow spring steel to be a general use steel.

Steel alloys are the most commonly used spring materials. The most popular alloys include high-carbon (such as the music wire used for guitar strings), oil-tempered low-carbon, chrome silicon, chrome vanadium, and stainless steel.

Spring steel alloys feature the unique characteristic of being able to withstand considerable twisting or bending forces without any distortion. Products made from these steel alloys can be bent, compressed, extended, or twisted continuously, and they will return to their original shape without suffering any deformation.

Spring steels are medium-to-high carbon content alloys generally featuring a carbon content of 0.5 to 1.0%. The other alloy additives typically include manganese and silicone with silicone being the key component in high yield strengths.



A wide range of materials are available for the manufacture of metal springs including:

- Carbon steels
- Alloy steels
- Corrosion resistant steels
- Phosphor bronze
- Spring brass
- Beryllium copper
- Nickel alloy steels
- Titanium alloy steels

<https://www.totalmateria.com/page.aspx?ID=CheckArticle&site=kts&NM=371>

9. Process by which a steel ingot is converted into a sheet is known as
- (a) Machining process (b) Forging process (c) **Rolling process** (d) None

Ans: c

Note: Closed die **drop forging** is a steel shaping process whereby a heated steel billet is placed on a lower die mould block, while an overhead, die-equipped ram hammer drives or “drops” down, forcing the metal to fill the contours of the two die blocks.

Drop forging is a metal forming process. A workpiece is inserted into a die and then hammered until it has assumed the shape of the die. The lower die is a stationary part, while the upper part is a moving hammer dropped onto the workpiece in order to deform it. Drop forging can be performed both at high or ambient temperature.

10. The process which is not case hardening is
- (a) Carburising (b) Cyaniding (c) Nitriding (d) **Austempering**

Ans: d

Austempering is heat treatment that is applied to ferrous metals, most notably steel and

ductile iron. In steel it produces a bainite microstructure whereas in cast irons it produces a structure of acicular ferrite and high carbon, stabilized austenite known as *ausferrite*. It is primarily used to improve mechanical properties or reduce / eliminate distortion.

11. The carburising cannot be done by

- (a) Pack carburising (b) Gas carburising
(c) Liquid carburising (d) Wax carburising

Ans:(d)

12. The purpose of carburising is

- (a) To increase the hardness of surface ultimately
(b) Only on steels with low carbon content
(c) For jobs in which in which to keep tough core
(d) All the above

Ans:(d)

13. Property of malleable iron which makes it suitable for crane hooks is

- (a) Corrosion resistance
(b) Malleability
(c) Ductility
(d) Tough, shock resistant fibrous structure

Ans:(d)

14. For axle forging the suitable steel will have carbon percentage of

- (a) 0.1 to 0.15 (b) 0.3 to 0.5 (c) 0.15 to 0.30 (d) 0.8 to 1.0

Ans:(a)

15. Process by which the length of a piece of metal is reduced and its cross sectional area increased is called

- (a) Folding (b) Swaging (c) Upsetting (d) Processing

Ans:(c)

16. One micron is equal to

- (a) 0.01 mm (b) 0.1 mm (c) 1 mm (d) 0.001 mm

Ans:(d)

17. Surface finish is indicated by

- (a) Inverted triangle (b) Triangle (c) Circle (d) Square

Ans:(a)

Note: Symbols that indicate the surface texture of machined and structural parts are used in industrial diagrams. The pictorial representation using these symbols is defined in ISO 1302:2002.

<https://www.keyence.com/ss/products/microscope/roughness/line/roughness-symbols.jsp>

18. Choose from the following the most accurate machine

- (a) Milling (b) Boring (c) Grinding (d) Jig boring

Ans:(d)

19. For feeding bars..... chuck is used

- (a) Collet (b) Three jaw (c) Four jaw (d) Jig boring

Ans:(a)

20. Choose the operation which can give the best finish for finishing a hole

- (a) Drilling (b) Reaming (c) Honing (d) Boring

Ans:(c)

21. The tolerance specified for a shaft is 25 ± 0.01 mm during inspection the actual measurement is as follows. The measurement on shaft A is 24.980 mm and on shaft B is 24.985 mm. Which of the following is correct?

- (a) Both shaft A and B are passed
 (b) Only shaft B is passed
 (c) Only shaft A is passed
 (d) Both shafts A & B are rejected

Ans:(d)

Note: Acceptable limit is 24.99 to 25.01

22. The speed of the driving shaft is 1600 rpm. The pinion A with 80 teeth is fitted on the driving shaft. The gear wheel B with 160 teeth is fitted on the driven shaft. Pinion A and gear wheel B are meshing with each other. What is the speed of the driven shaft?

- (a) 3200 rpm (b) 1600 rpm (c) 800 rpm (d) None of these

Ans:(c)

23. A steel shaft of 25 mm diameter is rotating at a speed of 400 rpm during a turning operation. What is the cutting speed in m/min.

- (a) 31.4 (b) 15 (c) 10 (d) None

Ans:(a)

24. In a piece of work of 350 mm length, at a rpm of 200 one complete cut is achieved in 7 minutes. What is the feed?

- (a) 50 mm/revolution (b) 2.5 mm/ revolution
(c) 0.25 mm/ revolution (d) None of these

Ans:(c)

25. Sine bars are used for accurate measurement of

- (a) Temperature (b) angle (c) Speed (d) Lengths

Ans:(b)

26. are used for locating one component in relation to indemnification to the other

- (a) Dowels (b) Screws (c) Files (d) Slip gauges

Ans:(a)

27. The ability of a material to resist abrasion is known as....

- (a) Hardness (b) Toughness (c) Elasticity (d) Stiffness

Ans:(a)

28. Hardness of a material is measured in

- (a) BHN/RC/VPH (b) kg/cm² (c) kgm (d) kw

Ans:(a)

29. Increase in cutting speed ... tool wear

- (a) Increases (b) Decreases (c) Does not affect (d) None of these

Ans:(a)

30. Which of the following materials is normally used for making surface plates?

- (a) Granite (b) Wood (c) Ceramics (d) Glass

Ans:(a)

31. Among the following materials, choose the hardest material

- (a) Cast iron (b) Mild steel (c) Aluminium (d)Diamond

Ans: (d)

32. Which of the following machine use single point cutting tool?

- (a) Milling machine (b) Grinding (c) Broaching (d) Lathe

Ans:(d)

33. In 18-4-1- high speed steel the percentage of chromium is

- (a) 18 (b) 4 (c) 1 (d) 77

Ans:(b)

A common type of high-speed steel contains 18% tungsten, 4% chromium, 1% vanadium, and only 0.5–0.8% carbon

34. To increase the softness of a material the process adopted is

- (a) Normalising (b) Annealing (c) Hardening (d) None of these

Ans:(b)

35. In a two stroke IC engine, there is a power stroke for

- (a) Every revolution of crankshaft
 (b) 2 revolutions of crankshaft
 (c) 4 revolutions of crankshaft
 (d) None of these

Ans:(a)

36. In the dimension $76^{\pm 0.01}$ mm the nominal dimension is

- (a) 76 mm (b) 76.01 mm (c) 76.1 mm (d) 75.99 mm

Ans:(a)

37. The screw of the micrometer has a pitch of 0.5 mm. and number of divisions on thimble are 100. What is the least count?

- (a) 0.5 mm (b) 0.05 mm (c) 0.005 mm (d) None of these

Ans:(c)

38. Compression ratio in petrol engine

- (a) 4 : 1 to 10 : 1 (b) 10 : 1 to 15 : 1 (c) 5 : 1 to 15 : 1 (d) 8 : 1 to 15 : 1

Ans: (d)

39. Compression ratio in a diesel engine

- (a) 10 : 1 (b) 10 : 1 to 15 : 1 (c) 14 : 1 to 22 : 1 (d) 8 : 1 to 15 : 1

Ans: (c)

40. No. of power stroke in a 4 stroke IC engine in one cycle is

- (a) 1 (b) 2 (c) 3 (d) 4

Ans: (a)

41. Firing order of 4 cylinder internal combustion engine is

- (a) 1,3,4,2 (b) 1,2,4,3 (c) 1,2,3,4 (d) 1,3,2,4

Ans:a

42. Function of carburettor in as engine

- (a) To supply air-fuel in correct ratio
(b) Feed petrol
(c) To increase power output
(d) To pump fuel

Ans: (a)

43. Excessive black smoke from engine is due to

- (a) Excess fuel supplied or fast throttling
(b) Excess engine oil
(c) Dirty air
(d) Dirty fuel

Ans : (a)

44. Torque convertor eliminates

- (a) Clutch (b) Gear box

(c) Clutch and gear box

(d) For the application of brakes

Ans:(b)

The torque **converter** acts as a clutch and **eliminates** the shock load between the gearbox and the coupler while still allowing to operate an automatic transmission.

The torque converter is the most common type of automatic transmission in the world of passenger cars.

45. Hydraulic brakes works on the principle of

(a) **Pascal's Law**

(b) Joules law

(c) EMI

(d) None

Ans: (a)

46. Source of electrical power in car for starting is

(a) **Battery**

(b) Self starter

(c) Combustion energy

(d) Distributor

Ans: (a)

47. The number of "valve" used in every cylinder of a 4 stroke IC engine is

(a) **Minimum one inlet valve and one exhaust valve**

(b) Two inlet valve

(c) Two exhaust valve

(d) None of these

Ans:(a). But generally 2 inlet vales and 2 exhaust vales are used.

48. In an IC engine, excessive lube oil consumption is due to

(a) Heating of engine

(b) Excessive valve clearance

(c) **Wear of the cylinder or its liner**

(d) Low pressure of oil

Ans:(c)

Note1: The main sources of engine lubricating oil consumption include the piston-ring-liner system, turbocharger, valve stems, and crankcase ventilation. Lubrication oil consumption is also affected by engine operation, such as by transients, and by the formulation of the lubricating oil. Significant reductions in engine-out PM emissions in diesel engines were achieved through the control of lubricating oil consumption. The control of lubricating oil consumption in engines equipped with sophisticated aftertreatment systems is even more critical than it is in cases where it is done solely to reduce engine-out PM emissions.

https://dieselnet.com/tech/lube_cons.php

Note2:

The main sources of engine lubricating oil consumption include the piston-ring-liner system, turbocharger, valve stems, and crankcase ventilation.

If there's **too much** clearance between the valve stems and guides, the **engine** will suck more **oil** down the guides and into the cylinders.

Lubrication oil consumption is also affected by engine operation, such as by transients, and by the formulation of the lubricating oil.

Due to the running clearances required as part of the design, the moving parts in an engine, particularly the pistons and valves, are not 100% gas-tight and oil-tight. This means that oil is consumed at a low but steady rate.

In the combustion chamber, the oil film on the cylinder surface is also widely subject to high-temperature combustion. This causes the engine oil to vaporise, burn and be released into the environment with the exhaust gas

49. If a fuse blows frequently, one should:
- (1) replace it with a thin wire
 - (2) replace it with a thick copper wire
 - (3) replace it with a paper clip
 - (4) call an electrician

Ans:(4)

50. A person weighs more in a lift which is :
- (1) Moving up with a constant velocity
 - (2) Moving down with a constant velocity
 - (3) Accelerating upward
 - (4) Accelerating downward

ANS:(3)

Note: Elevator operation can be considered in these three situations:

1. the elevator has no acceleration (standing still, $v=0$ or moving with constant velocity $v=\text{constant}$)
2. the elevator has an upward acceleration, a
3. the elevator has a downward acceleration, a

Consider the normal force acting on a human from the elevator:

$N = mg$, if the elevator is at rest or moving at constant velocity

$N = mg + ma$, if the elevator has an upward acceleration

$N = mg - ma$, if the elevator has a downward acceleration