WORKSHOP TECHNOLOGY 2013 - NECTA FORM FOUR

Solutions from: Maktaba by TETEA

By Yohana Lazaro

1.

i	ii	iii	iv	v	vi	vii	viii	ix	x
B	D	C	D	D	A	D	D	B	D

2. (a)Types of plain carbon steel

-low carbon steel/mild steel

-medium carbon steel

-high carbon steel

(b)Metals not ground during spark testing are:-

-copper

-aluminium

-nickel-base alloys.

3.(a)The iron ore is put into the crushing machine in order to break it into smallest particles in order to make it possible bro remove unwanted materials.

(b) Sintering is the process of fussing together the particles of the iron into one solid mass by using a combination of pressure and heat, without melting the iron.

4.(a)cast iron is granular,and crystalline with a whitish or grayish tinge. While mild steel has a stringy structure.

(b) wrought iron.

(c) malleable is obvious the cast iron.

5.(a)tungsten increases the melting point of steel.

(b) manganese increase the weldability and machinability of steel.

(c)copper increase the strength and corrosion resistance.

6.(a)cast iron or steel.

(b)high carbon steel

(c)tool steel

7(a) Ingots is the piece bod pure metal that is cast into a shape suitable for other process.

(b)Killing steel is the the steel completely deoxidized by addition of an agent before casting,such that it will solidify quickly in moulds, with no gas bubbling out.

(c) segregation is the enrichment of atoms or ions or molecules at microscopic region in a material system.

8.(a)room temperature with air.

(b)in normal air

(c)quenching in water.

9.(a)White bearing metals are used for high load and high temperature application.Also to line cast iron is steel

-Bronze bearing metals are used to make bushes and bushes sleeves.

(b)Red shortness of steel is the tendency of steel to form cracks during hot pressure treatment, like forging,in the temperature range of red

10.(a) clearance fit

(b) interference fit

(c) transition fit

(d) clearance fit

(e) clearance fit

(f)clearance fit.

11.(a) Elasticity is the property of a material to retain its original shape and size when a load is removed from it.While plasticity is the property of a material to gain new shape when a load which exceed the elastic point is applied to it.

(b).The body will break when its elastic limit is exceeded.

12.(a)(i)carburizing is used in order to

-provide or to increase the Hardness of the metal.

-to improve the case hardening of steel s.

(ii)Pack carburizing is the type of carburizing whereby the steel is put into a container with carbonatious material like Coke or charcoal , and are heated together in such a way that,when the steel melt at high temperature,the carbon diffuse s into it easily.

(b)(i) Instruments used for layout

Pair of divider, protractor, scribers, center punch,tap meter and scrappers.

(ii)varnier calliper is used to measure external diameter while inside calliper is used to measure internal diameter

(c)Advantages of soluble oil on cutting

-it lubricates well during cutting process

-it helps to wash away easily the metal chips during cutting process

-it is helps to provide the good finished surface.

Disadvantage of soluble oil

-it is very expensive as compared to straigh oil.

13.(a)(i)Quenching is the process of cooling rapidly a heated metal above its critical point,While tempering is the process of cooling a metal slowly in water to be hard.

(ii) Steel has carbon content less than 2%,while cast iron has carbon content of greater than 2%, and the tensile strength of steel is less than that of cast iron due to the amount of carbon found in cast iron to be greater.

(iii)

	Hot working	Cold working
Temperature	a workpiece is heated at high temperature	The workpiece is cold
Hardness	The process bus not hard	The process is very hard
Finish	Good finished surface	rough finished surface

(b)In the Charly impact test, involves the striking a standard notched specimen with a controlled weight pendulum striking from a set height.This helps to measure the energy absorbed by the specimen during fracture.

(c)(i)-cementite is formed

(ii) pearlite is formed

(iii)martensite is formed.

(b) Metals tends to crack during quenching because they are forced to cool rapidly.

14(a)(i)It is convinience and less costly to make a hole of correct size due to availabilitiy of standard drills,reamers than shaft which is difficult to make a shaft of correct size.

(ii) Unilateral tolerance and bilateral toleranc

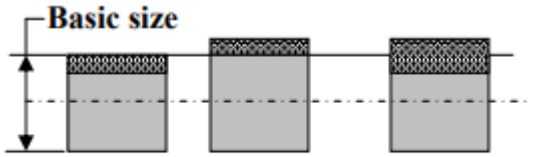


Fig. 1.3.2 Types of tolerance

(b)-basic size is the size with reference to which the limits of size are fixed.

-actual size is the actual measured dimension of the component.

-Allowance is the difference between the basic dimensions of the mating parts.

-Fit is the difference between the dimensions of assembling parts.

(c)-improper measurement reading

-poor calibrated tools used to make dimensions of a component to be manufactured

-environmental factors like temperature,make the component to expand.

(d)(i) corrosion of metals is the process where by the metal is oxidized or reduced by its environment.

(ii)iron is easily corroded in air while nickel is corroded slowly.

(iii)tinplating is the process of coating metal with tin in order to prevent corrosion,while galvanizing is the process of coating with zinc.

15.(a)cutting fluids have the following effects

-it lubricates the process of cutting

-it cools the cutting region

-provide a good finished surface

-helps to reduce the wear of produced component.

(b)-by deformation of the metal in the shear zone ahead of the cutting zone.

-at the point of separation when metal is physically pulled apart.

-by friction of chip as it rubs along the surface of cutting edge.

(c)-corrosion inhibitor

-promotes hot metalcutting

-provide lubrication and cooling

-promotes the emulsion and lubricity of cutting fluid.

-helps to remove the germs.

16.(i)Rolling machine

(ii)A-roller

B-workpiece,C-guide roller

(iii)Three rollers rolling machine.

(iv)Two metal pieces are placed between the rollers and then as it rotates. It compresses the metal in such a way that it obtain a new dimension after being rolled.

(b)advantages of hot Rolling

-easy to conduct

-good finished surface.

-less time consuming

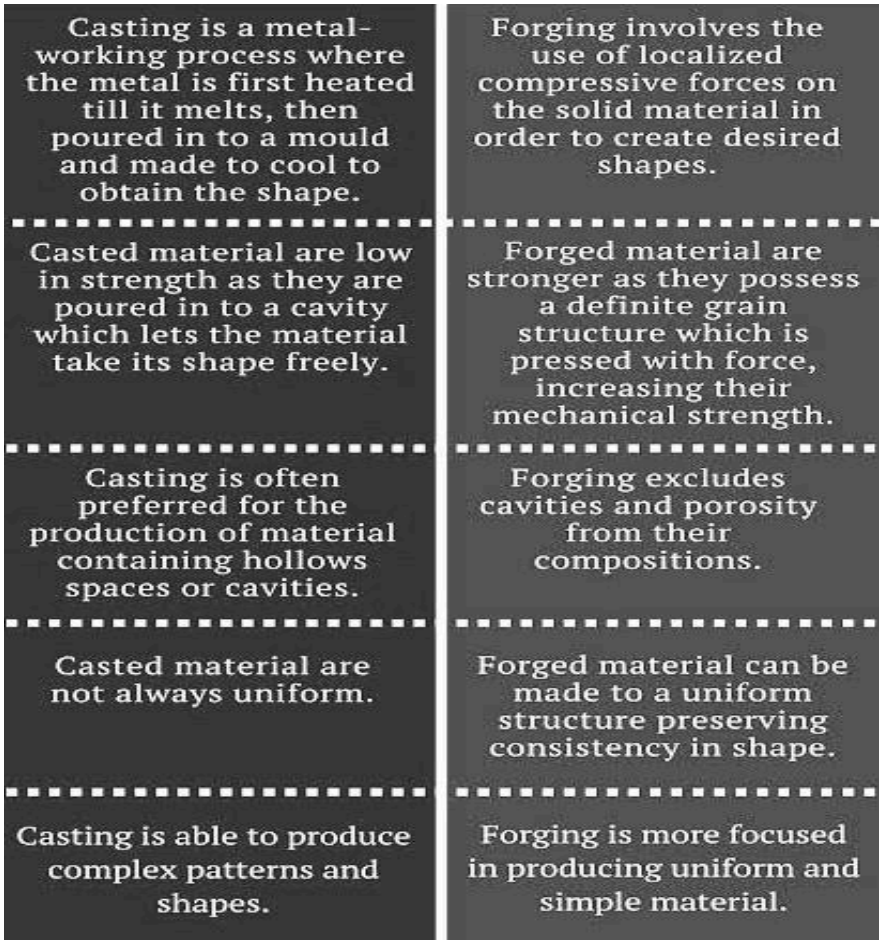
Disadvantages

-on cooling the finished surface can become rough

-it is expensive as compared to cold process.

(c)(i) presence of guide rollers helps to prevent the deflection of rollers.

(ii)Difference between casting and forging.



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