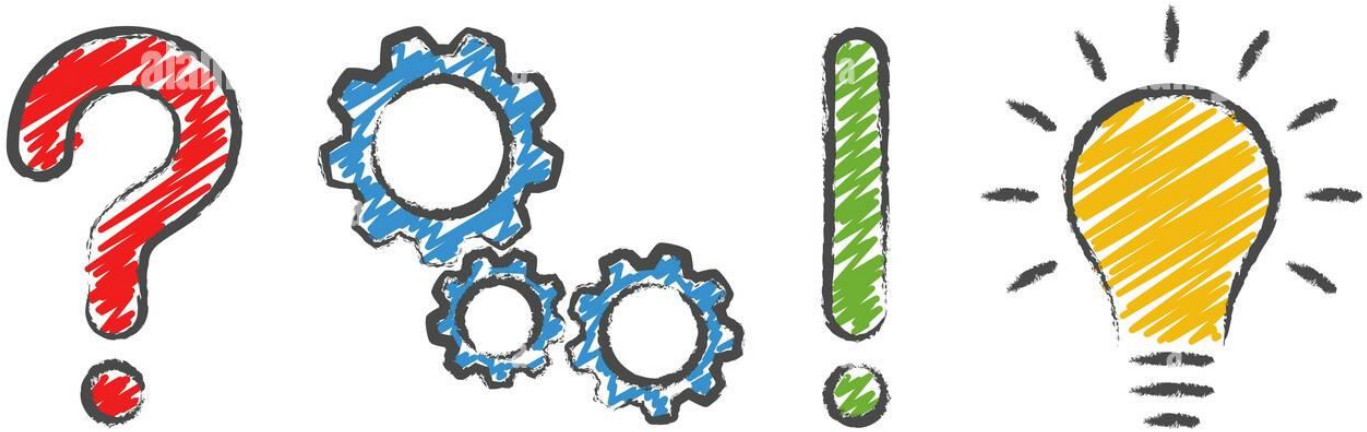
Questions with Answers for Gears?

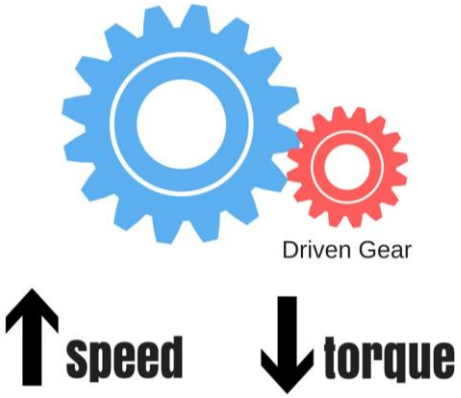
أسئلة وإجابات في التروس ؟

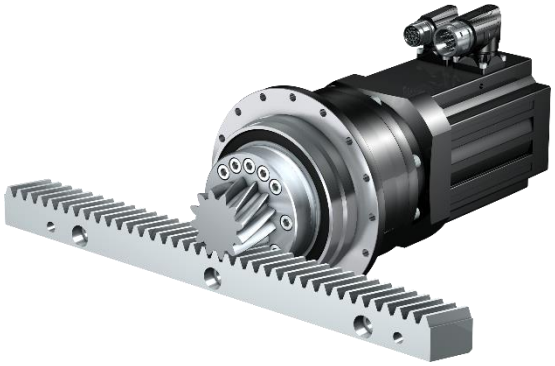


Q 1 : What Are 4 Things Gears are used for ?

Answer :

1. **Speed** : Different sized gears can be used to efficiently change the speed of a system.
2. **Torque** : Different sized gears can be used to change the Torque of a system
3. **Rotation direction :** Gears are also useful for changing the direction of rotational motion. Spur gears can reverse direction, worm gears change rotation al direction by 90 degrees, and bevel gears can transmit motion around corners
4. **Movement :** Rack and pinion gears are sometimes used for direct movement within a machine

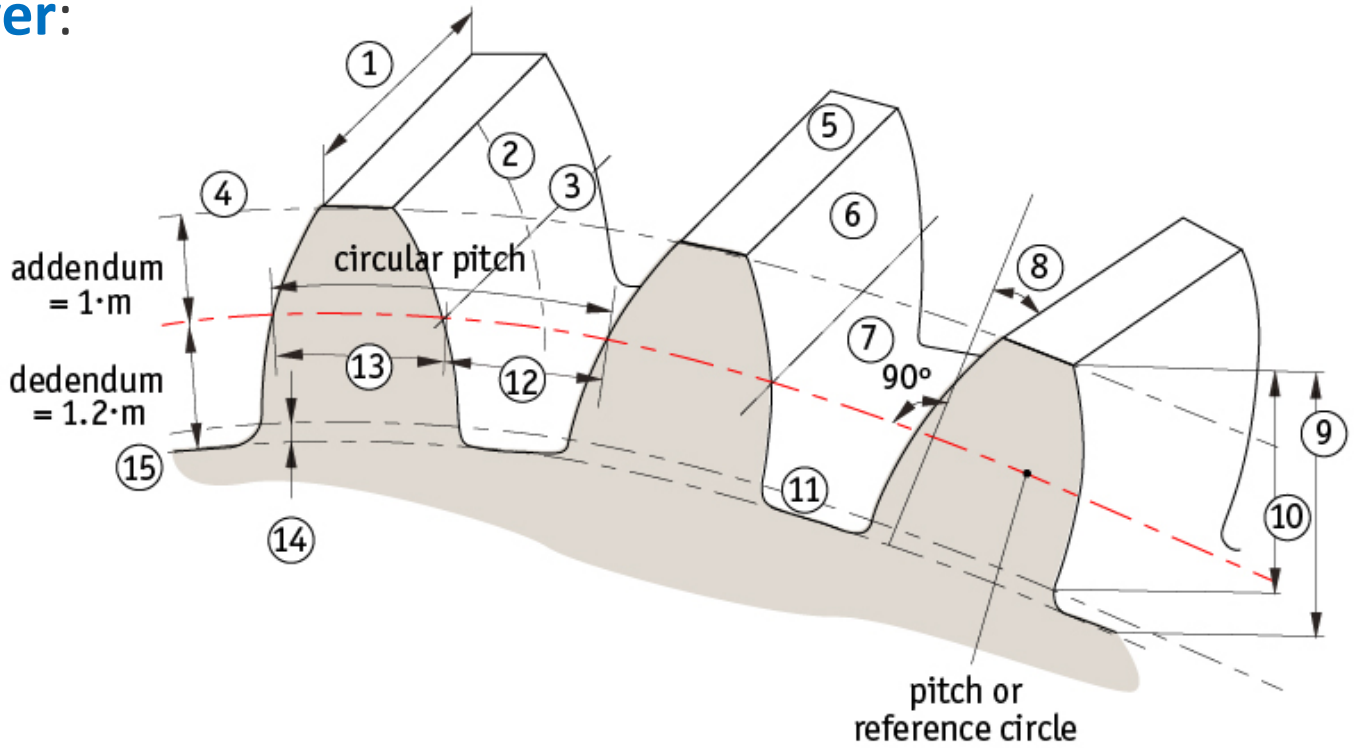




(Rack and pinion)

Q 2 : What are the parts of the gear?

Answer:

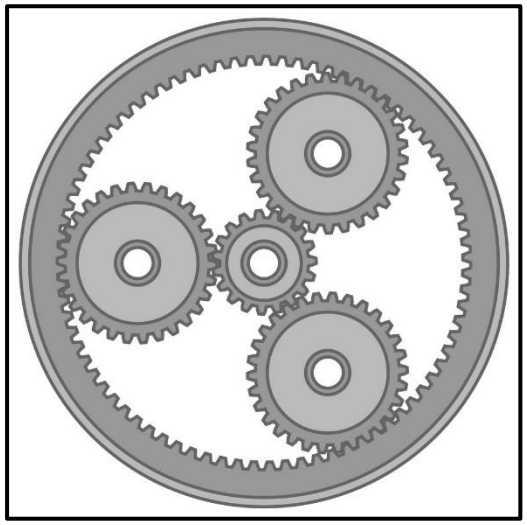


1. face width
2. profile line
3. flank line
4. addendum circle
5. topland
6. face
7. flank
8. pressure angle
9. whole depth
10. tooth or working depth
11. clearance circle
12. slot width
13. tooth thickness
14. clearance
15. dedendum circle

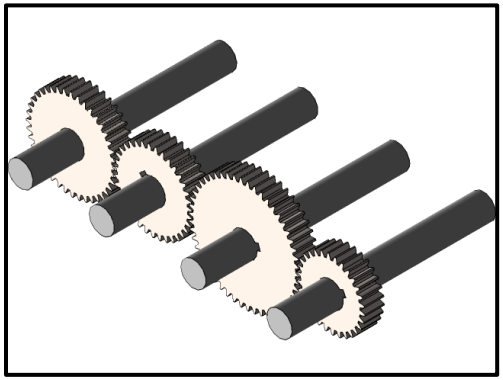
Q 3: What are Types of Gear Trains ?

Answer:

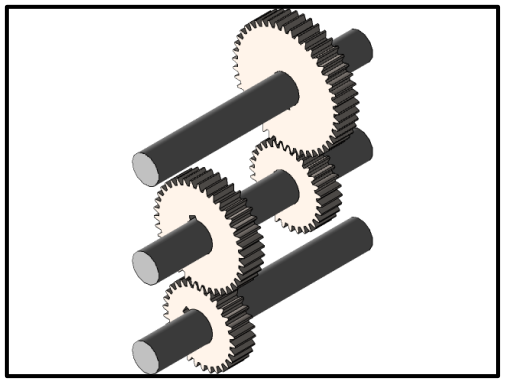
1. Simple gear train
2. Compound gear train
3. Reverted gear train
4. Epicyclic gear train



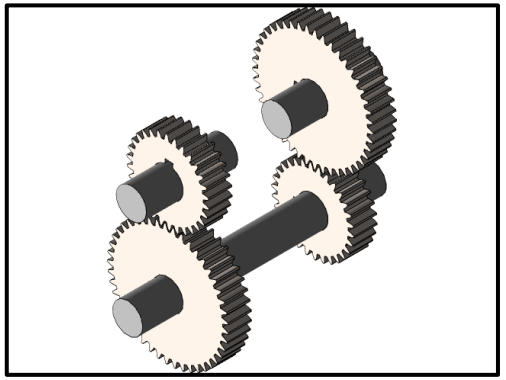
Epicyclic gear train



Simple gear train



Compound gear train

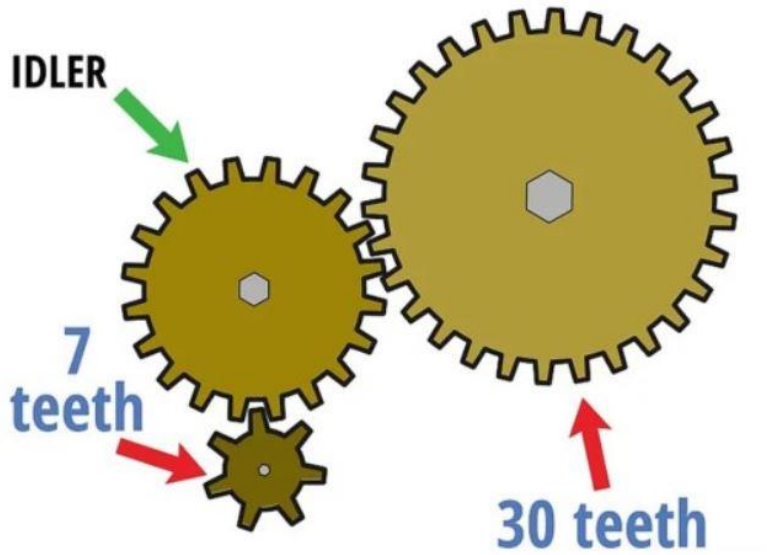


Reverted gear train

Q 4 : What is an idler gear ?

Answer:

- **Idler gears** are used when you need to transfer power across a larger distance or make a change in rotational direction between the input (driving) gear and the output (driven) gear
- Idle gears do not add more power or change the ratio of the driven to driving gears in any geared system.

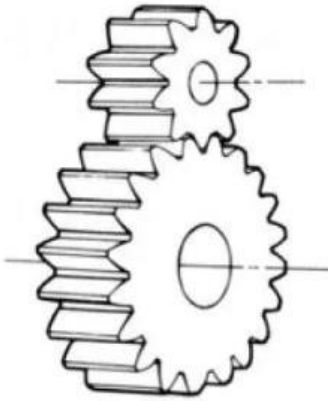


- **They are called idle** because they neither add or take away any mechanical advantage.

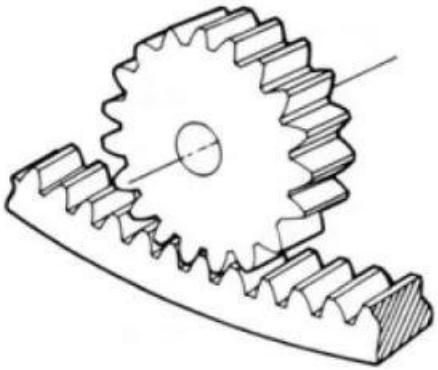
Q 5 : What are the classification of gears ?

Answer:

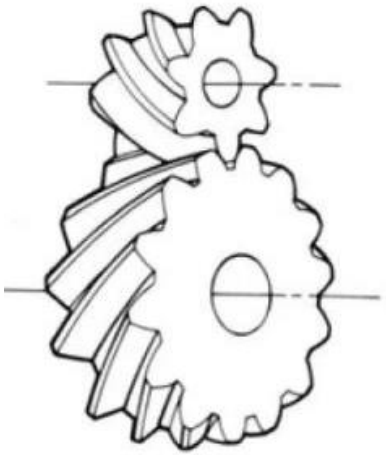
A . Parallel axes gears



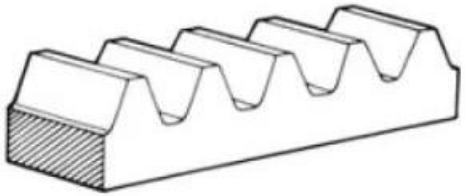
Spur Gear



Internal Gear



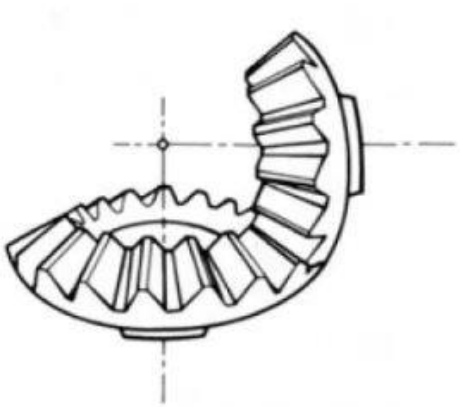
Helical Gear



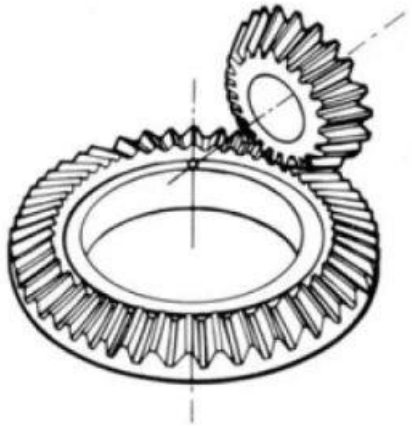
Gear Rack

Note : The gear rack is a portion of a spur gear with an infinite radius

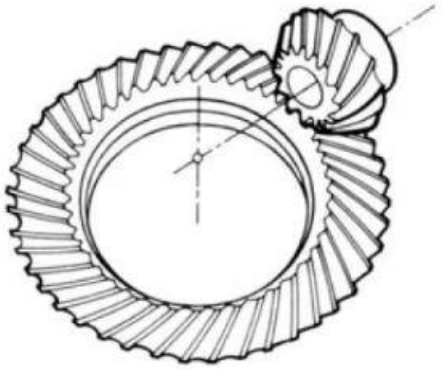
B . intersecting axes gears



Straight Bevel Gear



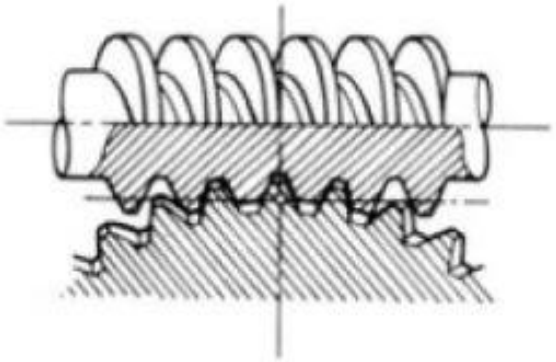
Spiral Bevel Gear



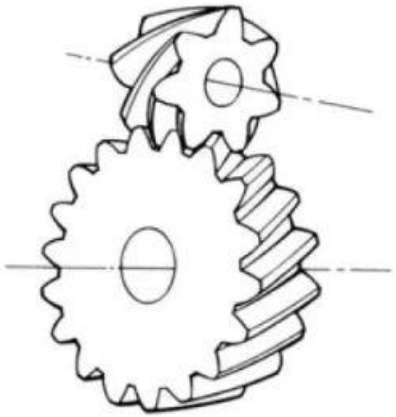
Zerol Bevel Gear

Note : Zerol Bevel Gear: This is a special type of spiral bevel gear, where the spiral angle is zero degree. It has the characteristics of both the straight and spiral bevel gears

C . Nonparallel and Nonintersecting Axes Gears



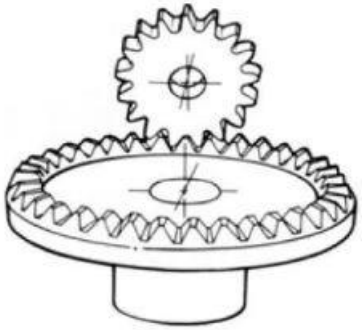
Worm Gear pair



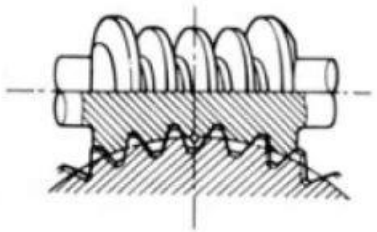
Screw Gear (Crossed Helical Gear)

Note : Worm gear pair is the name for a meshed worm and worm wheel. An outstanding feature is that it offers a very large gear ratio in a single mesh. It also provides quiet and smooth action. However, transmission efficiency is poor.

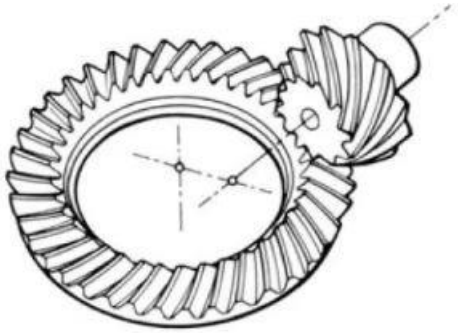
D . Other Special Gears



Face Gear



Enveloping Gear



Hypoid Gear

Note : Hypoid Gear : This gear is a slight deviation from a bevel gear that originated as a special development for the automobile industry.

Q 6 : What Material of gear manufacturing ?

Answer:

Gears can be made of all sorts of materials

- steel
- Brass
- Bronze
- cast iron
- ductile iron
- Aluminum
- plastics

Note : Steel is often most desirable because it offers a winning combination of high strength-to-weight ratio, high resistance to wear, the ability to enhance the physical properties through heat treatment, and competitive pricing.

Q 7 : Why are wheels in worm gears made of brass?

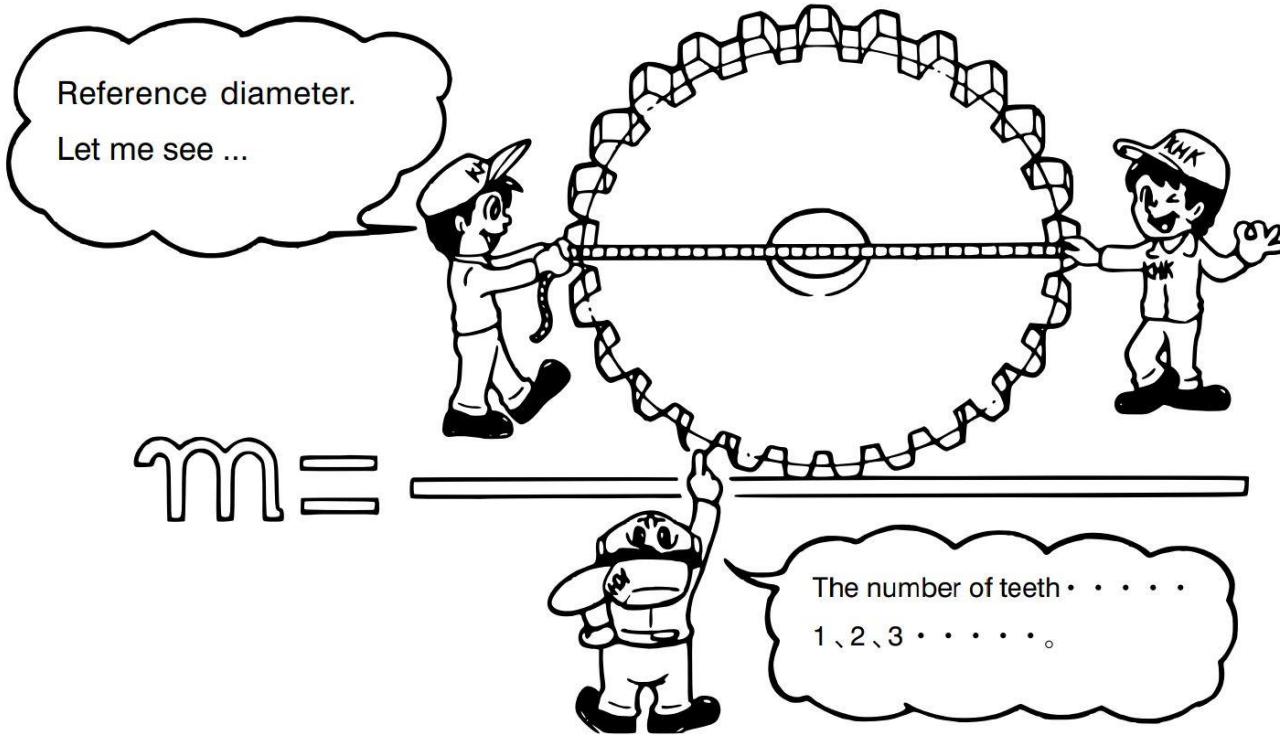
Answer:

- The most common worm gears are made with a brass wheel and a steel worm
- This is because the brass wheel is typically easier to replace than the worm itself.
- The wheel is made out of brass because it is **designed to be sacrificial**

Q 8 : What is gear module ?

Answer:

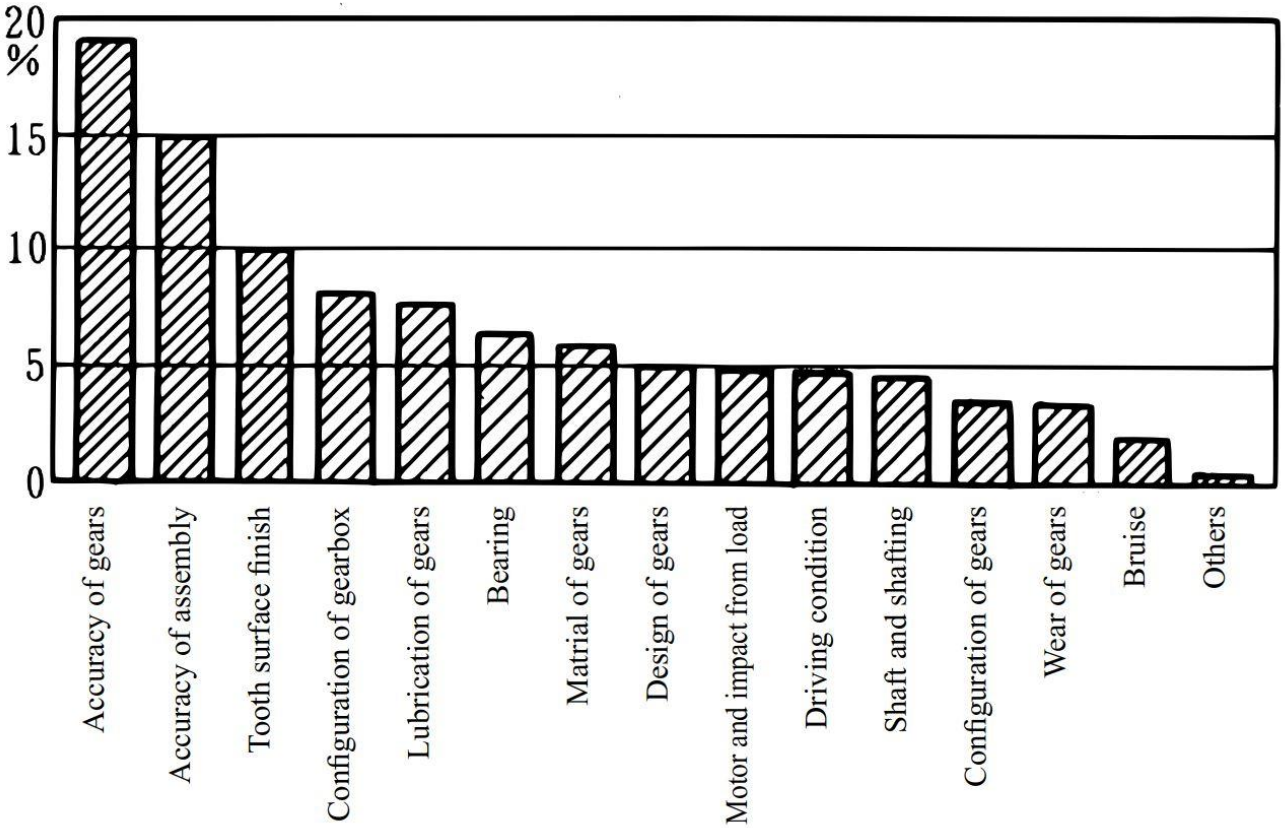
Module : is the unit of size that indicates how big or small a gear is. It is the ratio of the reference diameter of the gear divided by the number of teeth



Q 9 : What Causes gear noise ?

Answer:

Cause of nose and vibrations



Q 10 : What type of gear is rustproof ?

Answer:

***Stainless steel* gear and *plastic* gear**

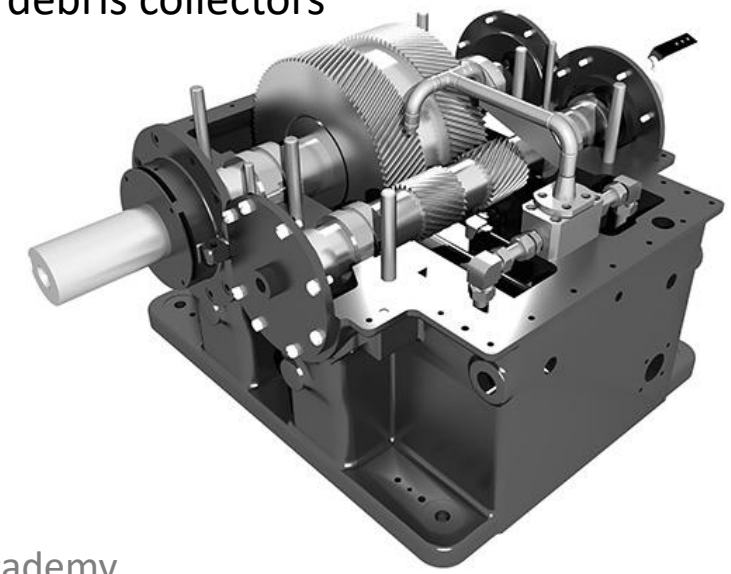
Stainless steel

Plastic Gear

Q 11 : What are the methods for checking the gearbox??

Answer:

- Visual inspection through inspection ports
- Borescope inspection
- Measure temperature
  - Thermometers
  - Resistance temperature detector (RTD) probes
  - Thermography
- Measure oil pressure
- Measure sound and vibration
- Inspect filter elements Inspect magnetic debris collectors
- On-site analysis of lubricant
- Laboratory analysis of lubricant
- Magnetic particle inspection of gears
- Dye penetrant inspection of gears
- Documenting gear condition
  - Written
  - Sketches
  - Photography
  - Contact patterns



Q 12 : The difference between the space width and the tooth thickness along the pitch circle is ……

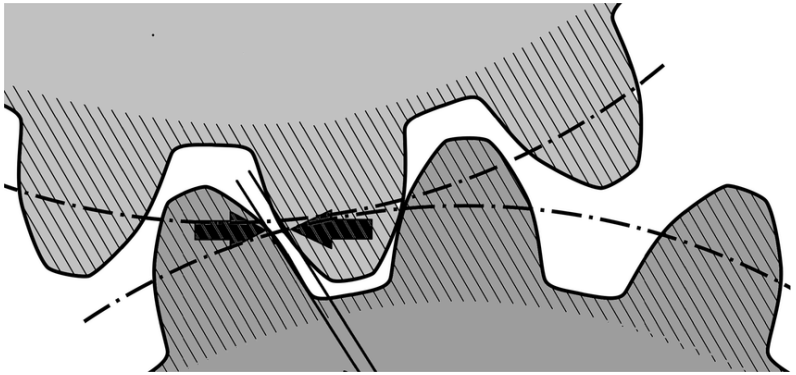
1.fillet

2.face width

3.flank

4.backlash

Answer:
4 : backlash



Q 13 : Which of the following can be used for power transmission in intersecting shafts?

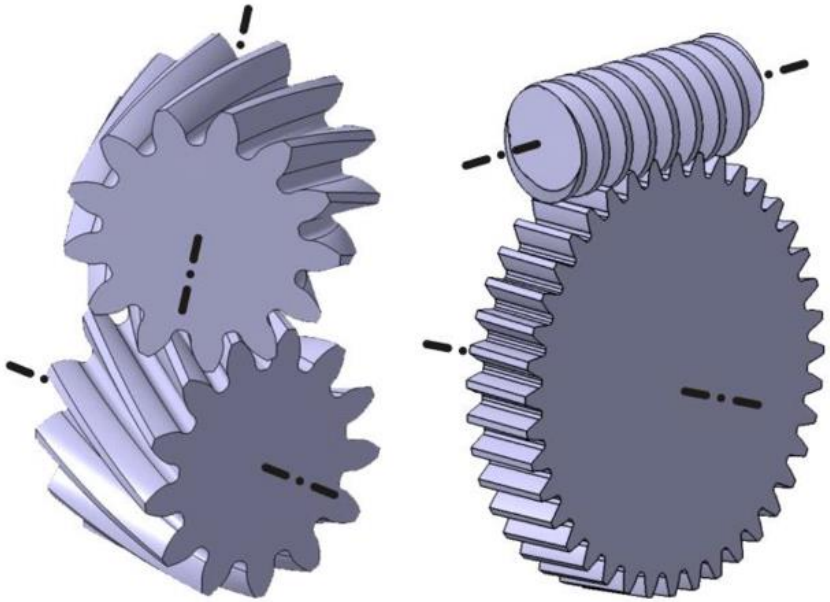
a) Spur Gear
b) Helical Gear
c) Bevel Gear
d) None of the listed

Answer:
c) Bevel Gear
Explanation: Bevel gears are used for power transmission in case of intersecting shafts

Q 14 : Is it possible to transmit power between shafts lying in different planes using gears?

a) Yes

b) No



Answer:

a) Yes

Explanation: Worm or crossed helical gears can be used in this case for power transmission.

Q 15 : Gear drive don’t require precise alignment of shafts.

a) True

b) False

Answer:
b) False
Explanation: A minute level of misalignment isn’t tolerated in gears

Q 16 : Spur gears can be used only when the two shafts are parallel..

a) True

b) False

Answer:

a) True

Explanation: The teeth are cut parallel to the axis of shaft

Q 17 : The teeth of the helical gears are cut parallel to the shaft axis.

a) True

b) False

Answer:

b) False

Explanation: They are cut at an angle with the shaft axis

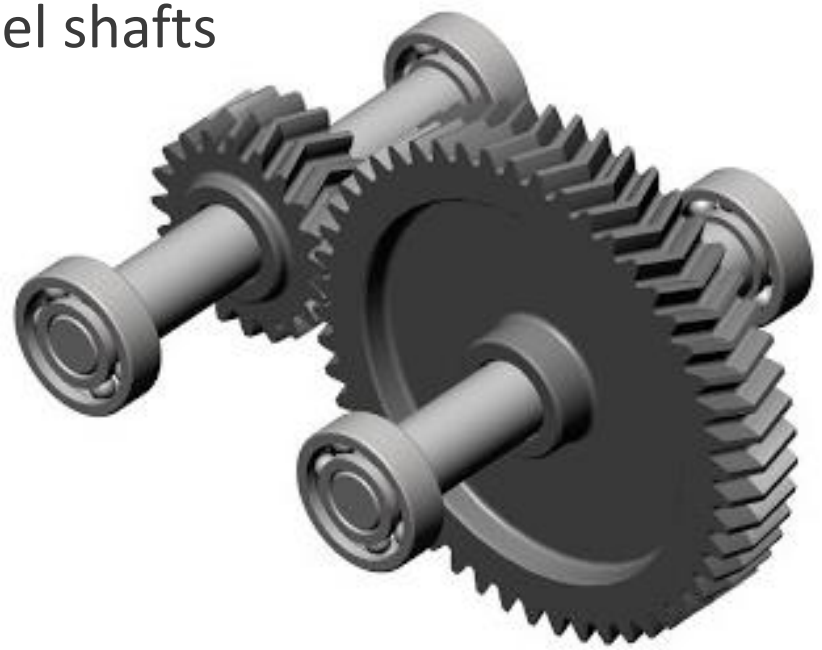
Q 18 : Herringbone gear can be used in……

a) Intersecting shafts only

b) Parallel shafts only

c) Both intersection and parallel shafts

d) None of the mentioned



Answer:

b) Parallel shafts only

Explanation: It consist of two helical gears with the opposite hand of the helix

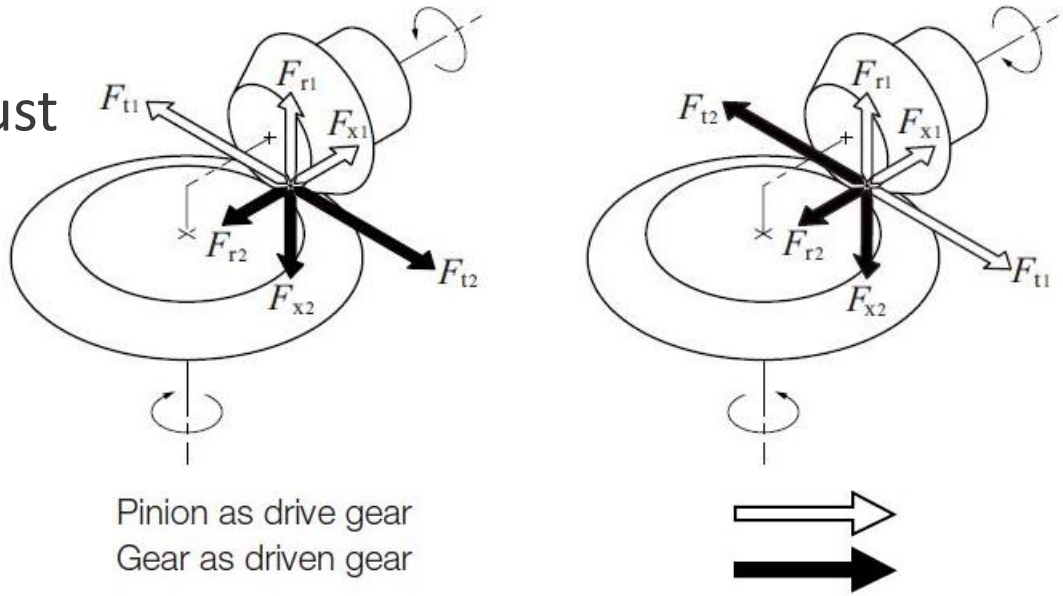
Q 19: Bevel gears impose …….. loads on the shafts

a) Radial and thrust

b) Radial

c) Thrust

d) Neither radial nor thrust



Answer:

a) Radial and thrust

Explanation Bevel gears have the shape of a truncated cone and tooth is cut straight or spiral

Q 20 : Which of the following are true for worm gear

a) Worm is in the shape of threaded screw

b) Threads on the worm have small lead

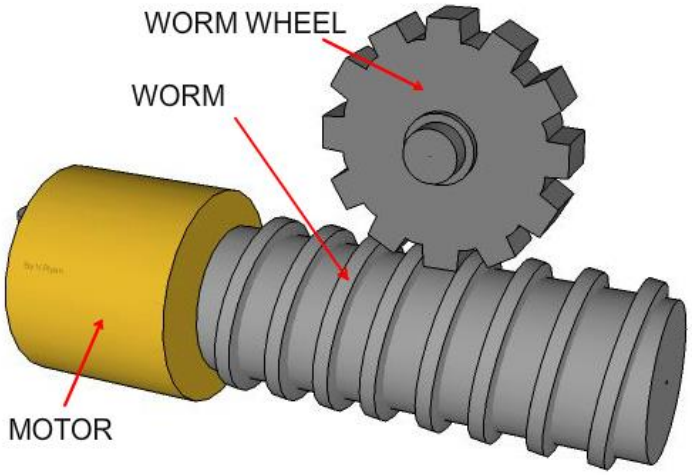
c) Worm imposes high thrust loads

d) Characterized by low speed reduction ratio

Answer:

d) Characterized by low speed reduction ratio

Explanation They are characterized by high speed reduction ratio



Q 21 : Greater the velocity ratio, smaller the gearbox.

a) True

b) Greater the gearbox

c) Size of gearbox remains unaffected

d) None of the listed

Answer:

b) Greater the gearbox

Explanation Greater velocity leads to increase in size of gear wheel which results in size of gearbox

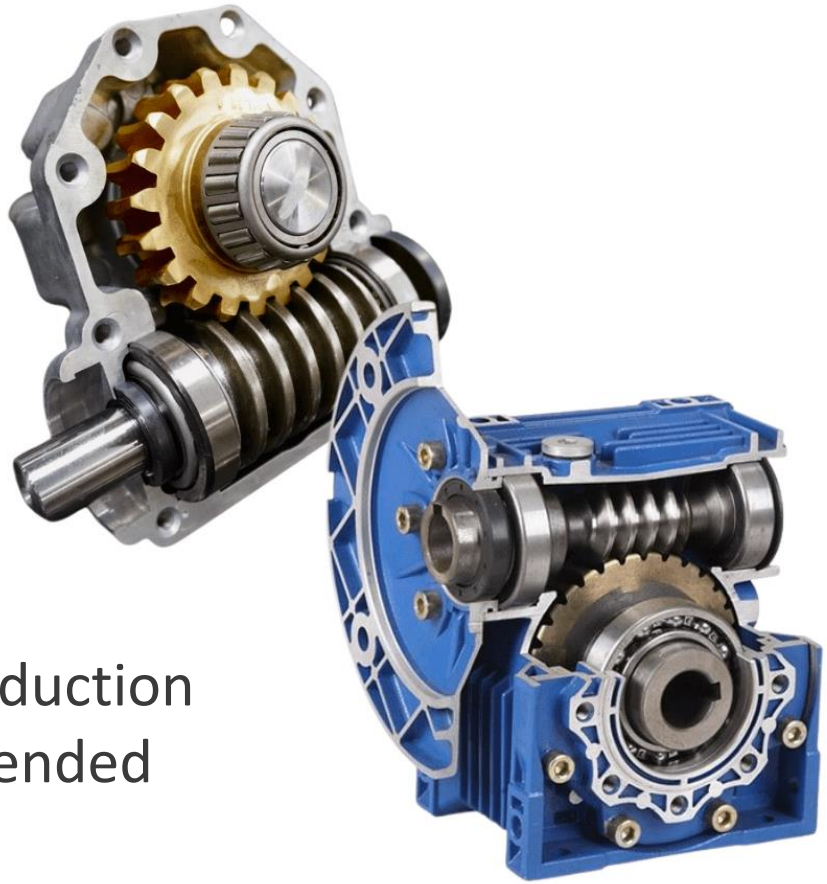
Q 22 : Required velocity ratio is 60:1, which of the following are recommended?

a) Worm

b) Spur

c) Bevel

d) None of the mentioned



Answer:

a) Worm

Explanation For high speed reduction ratio, worm gears are recommended

Q 23 : For a constant velocity ratio, the common normal to the tooth profile at point of contact must pass through a continuously variable point.

a) True
b) It pass through a fixed point
c) Constant velocity ratio isn't required, hence variable point is preferred
d) None of the listed

Answer:
b) It pass through a fixed point
Explanation It must pass through a fixed point called pitch to maintain a constant velocity ratio

Q 24 : The tooth profile most commonly used in gear drives for power transmission is.

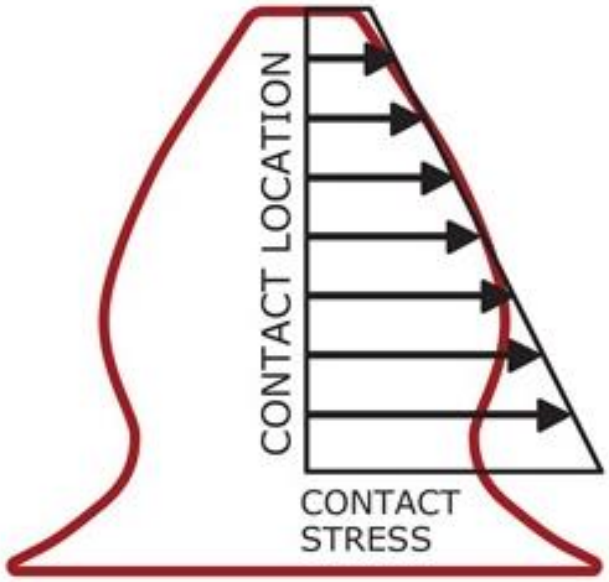
a) a cycloid

b) an involute

c) a hyperbola

d) a spiral

Answer:
an involute



Involute Tooth

Thanks .....