



**SNS COLLEGE OF TECHNOLOGY
COIMBATORE-641035**



**DEPARTMENT OF AUTOMOBILE ENGINEERING
16AU209 – MECHANICS OF AUTOMOBILE SYSTEMS**

2 MARKS

UNIT 4 GEARING AND FRICTION DRIVES

1. Define a gear.

A gear is a wheel provided with teeth which mesh with the teeth on another wheel or on to rack so as to give positive transmission of motion from one component to another.

2. What are the types of gears?

Spur gear Helical
gear Bevel gear
Worm gear
Rack and pinion

3. Define pitch circle

It is an imaginary circle which by pure rolling action would give the same motion as the actual gear.

4. Define pressure angle

It is the angle between the common normal to two gear teeth at the point of contact and the common tangent at the pitch point. It is denoted by ϕ The standard pressure angles are $14\frac{1}{2}^\circ$ and 20°

5. Define Dimeteral pitch.

It is the ratio of number of teeth to the pitch circle diameter in mm

6. Define module.

It is the ratio of the pitch circle diameter in mm to the number of teeth.

7. Define arc of contact

It is the path traced by a point on the pitch circle from the beginning to the end of engagement of a given pair of teeth.

8. State law of gearing.

The common normal at the point of contact between a pair of teeth must always pass through the pitch point.

9. Define interference

The phenomenon when the tip of a tooth under cuts the root of its mating gear is known as interference.

10. Define gear train

The combination of gear wheels by mean of which motion is transmitted from one shaft to another shaft is called a gear train.

11. What are the types of gear train?

Simple gear train.

Compound gear train.

Reverted gear train.

Epicyclic gear train.

12. What is simple gear train?

A simple gear train is one in which each shaft carries one wheel only. Simple gear trains are employed where a small velocity ratio is required.

13. Define train value

It is the reciprocal of velocity ratio

$$= \frac{\text{Speed of the driven}}{\text{Speed of the driver}} = \frac{\text{No. of teeth on driver}}{\text{No. of teeth on driven}}$$

14. What is a compound train?

A compound gear train is one in which each shaft carries two wheels one of which acts as a follower and other acts as a driver to the shaft. It is used for high velocity ratio.

15. What are the uses of epicyclic gear train?

Transmitting high velocity ratio, with gears of moderate size in a comparatively lesser space

16. What is an angle of obliquity in gear?

It is the angle between the common normal to two gear teeth at the point of contact and the common tangent at the pitch point. It is also called as pressure angle.

17. What is bevel gearing? Mention its types.

When the non-parallel or intersecting but coplanar shafts connected by gears, they are called bevel gears and the arrangement is bevel gearing.

Types.

1) Skew bevel gearing

2) Spiral gearing.

18. What is meant by arc of approach?

It is the portion of the path of contact from the beginning of the engagement to the pitch point.

19. What is meant by arc of recess?

It is the position of the path of contact from pitch point to the end of the engagement to the pitch

20. Define normal and axial pitch in helical gears.

Normal pitch is the distance between similar faces of adjacent teeth, along a helix on the pitch cylinder normal to the teeth.

Axial pitch is the distance measured parallel to the axis between similar faces of a adjacent teeth.

21. What are the methods to avoid interference?

The height of the teeth may be reduced.

The pressure angle may be increased.

22. What is the advantage when arc of recess is equal to arc of approach in meshing gears?

When arc of recess equal to arc of approach, the work wasted by friction is minimum and efficiency of drive is maximum.

23. What do you know about tumbler gear?

Tumbler gears are those which are used in lathes for reversing the direction of rotation of driven

24. Define contact ratio.

It is the ratio of the length of arc of contact to the circular pitch is known as contact ratio.

The value gives the number of pairs of teeth in contact.

25. Where will the interference occur in an involute pinion and gear are in mesh having same size of addendum?

There will be an interference between the tip of pinion and flank of gear.

26. Define interference.

The phenomenon when the tip of tooth undercuts the roots on its mating gear is known as interference.

27. What you meant by non standard gear teeth?

The gear teeth obtained by modifying the standard proportions of gear teeth parameters is known as non standard gear teeth.

28. Define cycloidal tooth profile and involute tooth profile.

A cycloid is the curve traced by a point on the circumference of a circle which rolls without slipping on a fixed straight line.

Involute profile is defined as the locus of a point on a straight line which rolls without slipping on the circumference of a circle.

29. Define Backlash.

It is the difference between the tooth space and the tooth thickness along the pitch circle.

Backlash = Tooth space – Tooth thickness.

30. Write velocity ratio in compound train of wheels?

Speed of last follower- Product of teeth on drives. Speed of first driver- Product of teeth on followers.

31. Define simple gear train.

When there is only one gear on each shaft, it is called as simple gear train.

32. What is meant compound gear train?

When there are more than one gear on shaft, it is called a compound gear train.

33. What is the advantage of a compound gear train over a simple gear train?

The advantage of a compound gear train over a simple gear train is that a much larger speed reduction from the first shaft to the last shaft can be obtained with small gears.

34. What is the externally applied torques used to keep the gear train in equilibrium?

1. Impart torque on the driving member.
2. Resisting or holding torque on the driven member.
3. Holding or braking torque on the fixed member.

35. Where the epicyclic gear trains are used?

The epicyclic gear trains are used in the back gear of lathe, differential gears of the automobiles, pulley blocks, wrist watches, etc.

