19MET302 & Theory of Machines

Unit -III Kinematics of CAM & GEARS

1. What is a cam?
A cam is a rotating machine element which gives reciprocating or oscillating motion to another element known as follower.

2. Give some examples of cam.
1) Radial or disc cams.
2) Cylindrical or barrel cams.
3) End or face cams.
4) Wedge cams.

3. Define tangent cam.
When the flanks of the cam are straight and tangential to the base circle and nose circle the cam is known as tangent cam.

4. What ate the different motions of the follower?
1) Uniform motion.
2) Simple harmonic motion.
3) Uniform acceleration and retardation.
4) Cycloidal motion.

5. How can high surface stress in flat faced follower be minimized?
High surface stress in the follower is minimized by machining the flat end of the follower to a spherical shape.

6. Where are the roller follower extensively used?
Roller followers are extensively used where more space is available such as in stationary gas oil engines, and aircraft engines.

7. Define dwell period?
The period during which the follower remains at rest is called dwell period.

8. Explain offset follower.
When the motion of the follower is along an axis away from the axis of the cam centre, it is called offset follower.

9. Define trace point.
It is a reference point on the follower and is used to generate the pitch curve. In case of knife edge follower the knife edge represents the trace point and the pitch curve corresponds to the cam profile.

10. Define pressure angle with respect to cams.
It is the angle between the direction of the follower motion and a normal to the pitch curve. This angle is very important in designing a cam profile. If the pressure angle is too large, a reciprocating follower will jam in its bearings.

11. Define lift or stroke in cam.
It is the maximum travel of the follower from its lowest position to the topmost position.

12. Define undercutting in cam. How it occurs?
The cam profile must be continuous curve without any loop. If the curvature of the pitch curve is too sharp, then the part of the cam shape would be lost and thereafter the intended cam motion would not be achieved. Such a cam is said to be undercut.
Undercutting occurs in the cam because of attempting to achieve too great a follower lift with very small cam rotation with a smaller cam.

13. What do you know about nomogram?
In nomogram, by knowing the values of total lift of the follower and the cam rotation angle for each segment of the displacement diagram, we can read directly the maximum pressure angle occurring in the segment for a particular choice of prime curcle radius.

14. How can you prevent undercutting in cam?
1) By decreasing the follower lift.
2) By increasing cam rotation angle.
3) By increasing the cam size.

15. What do you know about gravity cam?
In this type, the rise of the cam is achieved by the rising surface of the cam and the return by the force of gravity or due to the weight of the cam.

16. Write the different types of follower.
1) Knife edge follower
2) Roller follower
3) Mushroom or flat faced follower
4) Spherical faced or curved shoe follower.

17. What is cam profile?
The surface of cam which comes into contact with follower, is known as cam profile.

18. What is base circle?
It is the smallest circle that can be drawn to the cam profile. The radius of the base circle is called the least radius of the cam.

19. What is trace point?
It is a reference point on the follower to trace the cam profile. In case of a knife edge follower, the knife edge itself is a tracing point and in roller follower, the centre of the roller is the tracing point.

20. What is pitch curve?
The locus or path of the tracing point is known as the pitch curve. For the purpose of laying out the cam profiles, it is assumed that the cam is fixed and the follower rotates around it.

21. What is prime circle?
The smallest circle drawn tangent to the pitch curve is known as prime circle.

22. What is pressure angle?
It is the angle between the direction of the follower motion and a normal to the pitch curve. This angle is very important in cam design as it represents steepness of the cam profile.

23. What is pitch point?
It is the point on the pitch curve at which the pressure angle is maximum.

24. What is pitch circle?
It is the circle passing through the pitch point and concentric with the base circle.

25. What is cam angle?
It is the angle of rotation of the cam for a definite displacement of the follower.