Reg. No. :

Duration: 1:15hrs   Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. In a reciprocating steam engine, which of the following forms a kinematic link   CO1- R

   (a) Cylinder and piston   (b) Piston rod and connecting rod

   (c) Crank shaft and fly wheel   (d) Flywheel and engine frame

2. Which of the following mechanism is made up of turning pairs?   CO1- U

   (a) Scott Russel's mechanism   (b) Peaucellier's mechanism

   (c) Hart's mechanism   (d) None of the above

3. The magnitude of linear velocity of a point B on a link AB relative to point A is   CO2- U

   (a) $\omega.AB$ (b) $\omega(AB)^2$ (c) $\omega^2.AB$ (d) $(\omega.AB)^2$

4. The direction of linear velocity of any point on a link with respect to another point on the same link is   CO2- R

   (a) Parallel to the link joining the points   (b) Perpendicular to the link joining the points

   (c) At 45° to the link joining the points   (d) None of the above

5. The size of a cam depends on   CO3- R

   (a) Base circle   (b) Pitch circle   (c) Prime circle   (d) Pitch curve

6. When the flat faced follower is circular, it is called a   CO3- R

   (a) Roller follower   (b) Spherical follower

   (c) Mushroom follower   (d) Offset follower

7. The size of gear is usually specified by   CO4- R

   (a) Pressure angle   (b) Circular pitch   (c) Diametral pitch   (d) Pitch circle diameter

8. The contact ratio of gear is   CO4- R
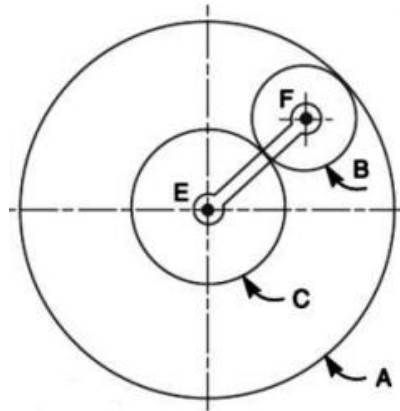
   (a) Zero   (b) Less than one

   (c) Greater than one   (d) None of the above

9. When the axes of first and last gear are co-axial , then gear train is known as   CO5- R

   (a) Simple gear train   (b) Compound gear train

   (c) Reverted gear train   (d) Epicyclic gear train

10. A differential gear in an automobile is a   CO5- R

   (a) Simple gear train   (b) Epicyclic gear train

   (c) Compound gear train   (d) None of the above

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Explain Whitworth quick return mechanism with a neat sketch.   CO1- U   (8)

12. In a four bar chain ABCD, AD is fixed and is 150 mm long. The crank   CO2- App   (8)
    AB is 40mm long and rotates at 120 r.p.m. clockwise, while the link
    CD = 80 mm oscillates about D. BC and AD are of equal length. Find
    the angular velocity of link CD when angle   BAD = 60°.

13. A cam is to give the following motion to a knife-edged follower :   CO3- App   (8)
    1.Outstroke during 60° of cam rotation;
    2.Dwell for the next 30° of cam rotation ;
    3. Return stroke during next 60° of cam rotation and 4.Dwell for the
    remaining 210° of cam rotation. The stroke of the follower is 40 mm
    and the minimum radius of the cam is 50mm. The follower moves with
    uniform velocity during both the outstroke and return strokes. Draw the
    profile of the cam when
    (i) the axis of the follower passes through the axis of the cam shaft.
    (ii) the axis of the follower is offset by 20 mm from the axis of the cam
    shaft.

14. A pinion of 20 involute teeth and 125 mm pitch circle diameter drives a   CO4- U   (8)
    rack. The addendum of both pinion and rack is 6.25mm.What is the
    least pressure angle which can be used to avoid interference? With this
    pressure angle, find the length of the arc of contact and the minimum
    number of teeth in contact at a time.

15. An epicyclic gear consists of three gears A, B and C as shown in figure. CO5- App (8)
The gear A has 72 internal teeth and gear C has 32 external teeth. The gear B meshes with both A and C and is carried on an arm EF which rotates about the center of A at 18 r.p.m. If the gear A is fixed, determine the speed of gears B and C.

Epicyclic gear

53A05