

Code: 9A21506

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2012

MECHANISMS AND MECHANICAL DESIGN

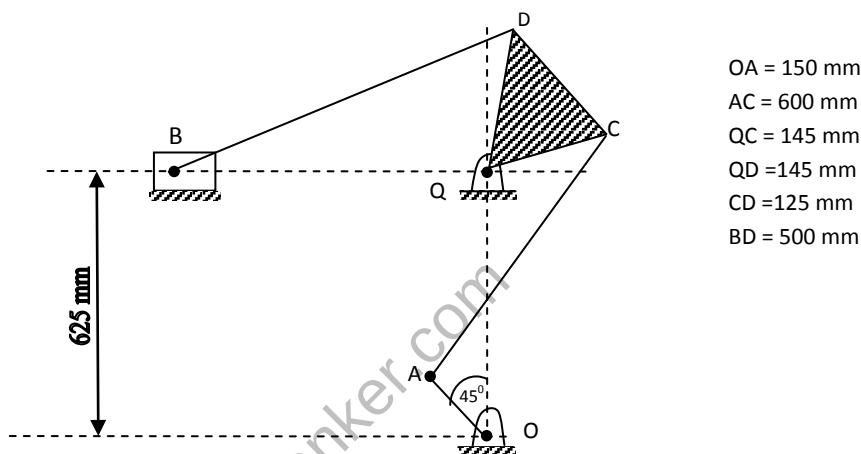
(Aeronautical Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 Explain any two inversions of single slider crank chain.
- 2 What do you mean by coriolis component of acceleration? When it will exist? How will you find the direction of coriolis component of acceleration?
- 3 Locate all the instantaneous centres for the mechanism shown in below figure. Determine the linear velocity of slider B and angular velocity link AC, when the crank rotates at 60 r.p.m



OA = 150 mm
AC = 600 mm
QC = 145 mm
QD = 145 mm
CD = 125 mm
BD = 500 mm

- 4 How do the effects of gyroscopic couple and of centrifugal for make the rider of a two wheeler to tilt on one side? Derive a relation for the limiting speed of vehicle.
- 5 (a) Explain the functions of cams and followers. What are different applications of cams in automobiles?
(b) Derive the equations for the estimation of maximum acceleration and maximum velocity if the rotation of the follower follows simple harmonic motion.
- 6 (a) Differentiate between special cams and ordinary cams.
(b) Derive the equation for the estimation of maximum velocity and maximum acceleration for circular arc cam with straight flank.
- 7 (a) What are different types of helical springs used in automobiles? Explain their uses.
(b) A helical spring is made from a wire of 6 mm diameter and has outside diameter of 75 mm. If the permissible shear stress is 350 N/mm² and modulus of rigidity 84 N/mm², find the axial load, which the spring can carry and the deflection per active turn by considering the effect of curvature.
- 8 (a) What is higher pair? How gears are classified?
(b) Differentiate between bevel gears and worm gears with suitable applications.
