



(Pages : 3)



**A – 6378**

Reg. No. : .....

Name : .....

**Fifth Semester B.Tech. Degree Examination, September 2016  
(2008 Scheme)**

**08.503 : THEORY OF MACHINES (MP)**

Time : 3 Hours

Max. Marks : 100

**Instruction :** Answer *all* questions from Part – **A** and *any one full* question from *each* Module of Part – **B**.

**PART – A**

1. What is an inversion of mechanism ? Explain one such inversion of simple slider crank mechanism.
2. Explain Peaucellier's straight line mechanism.
3. Describe any one graphical synthesis of four bar mechanism.
4. Describe a shoe brake.
5. Explain Davi's steering gear mechanism.
6. What is slip in belt drive ?
7. What is interference in gear drive ?
8. Explain the motion analysis of planetary gear train.
9. How are gear drives classified ?
10. What is the difference between friction drive and positive drive ? **(10x4=40 Marks)**

**PART – B**

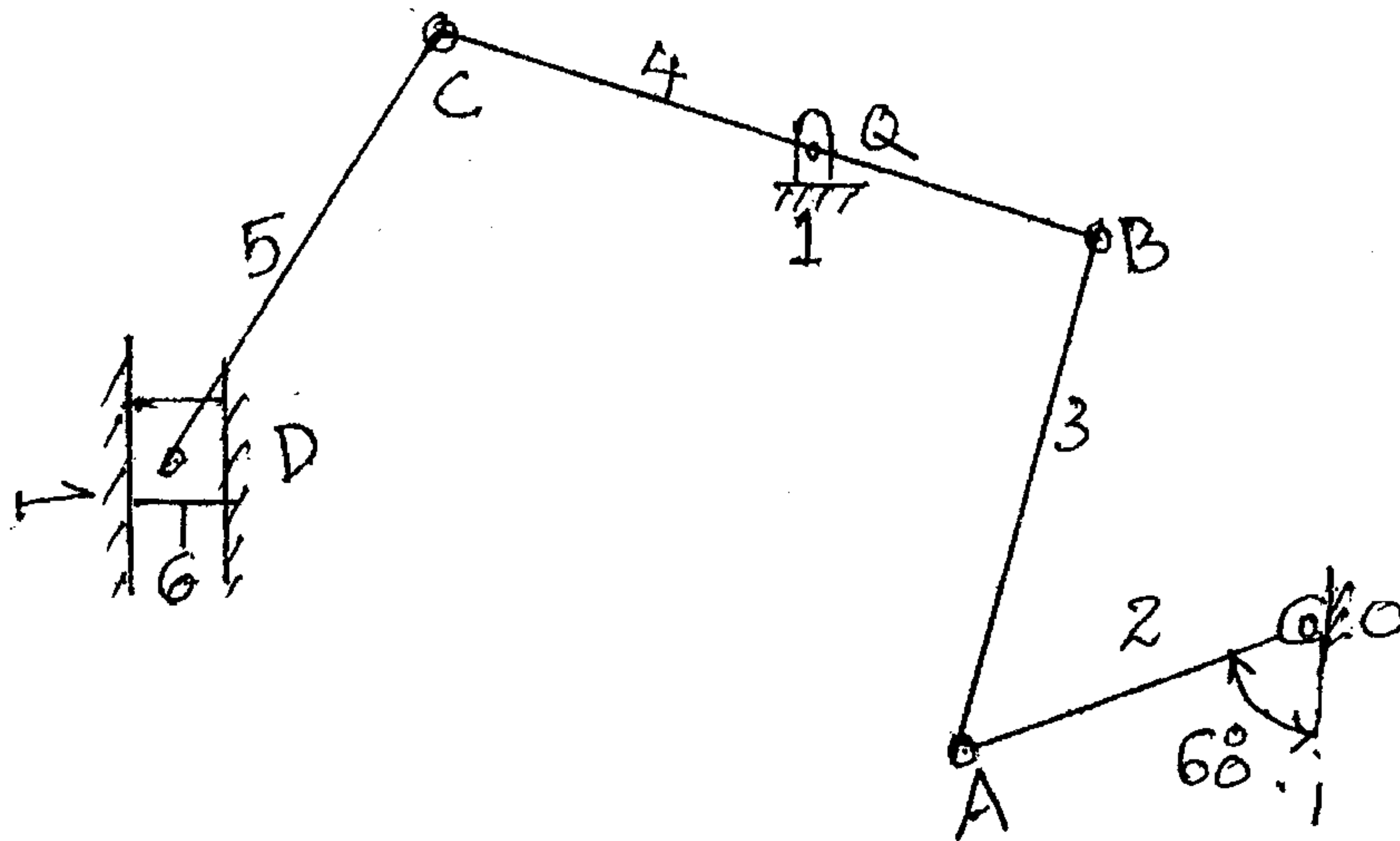
**Module – I**

11. a) Obtain a relation for degree of freedom of planar mechanism.  
b) Explain with sketch, quick return mechanism.

**P.T.O.**

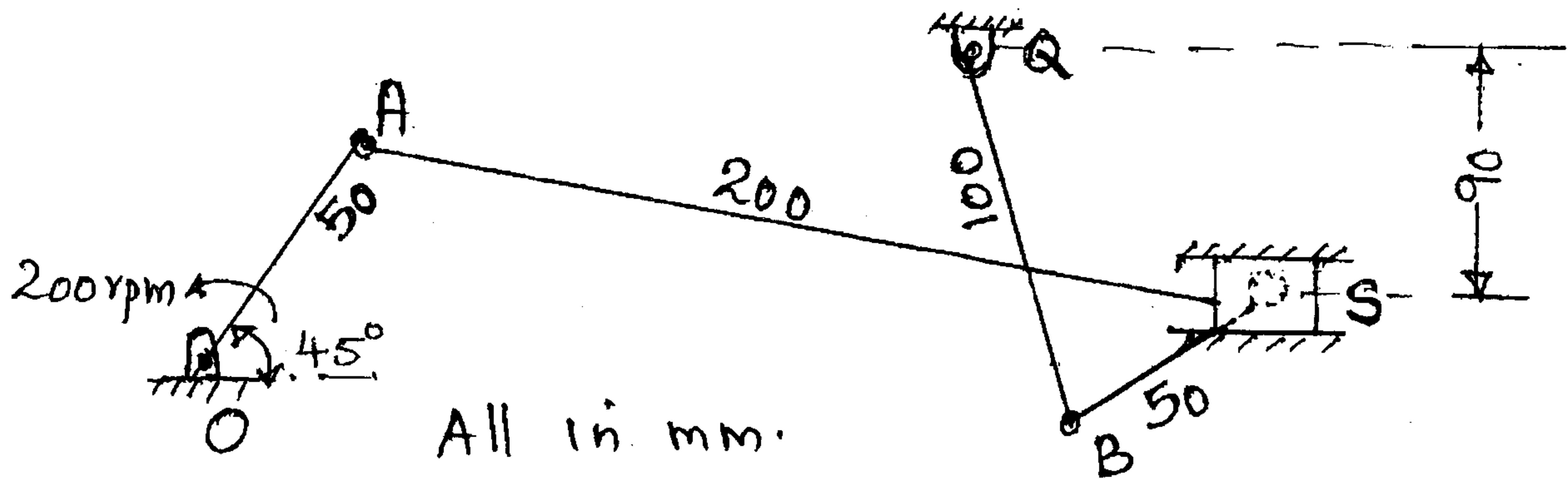


12. a) Prove Aronhold and Kennedy's theorem.  
 b) Fig. shows a six link mechanism. The dimensions of the links are  $OA = 220$  mm,  $AB = 485$  mm,  $BQ = 310$  mm,  $BC = 590$  mm,  $CD = 400$  mm. For the position when the crank  $OA$  makes an angle of  $60^\circ$  with the vertical, find the velocity of slider  $D$  by instant centre method. The crank rotates at 150 rpm.



Module - II

13. Fig. shows a mechanism in which  $O$  and  $Q$  are the fixed points. Determine the acceleration of the slider  $S$  and the angular acceleration of the link  $BQ$ .

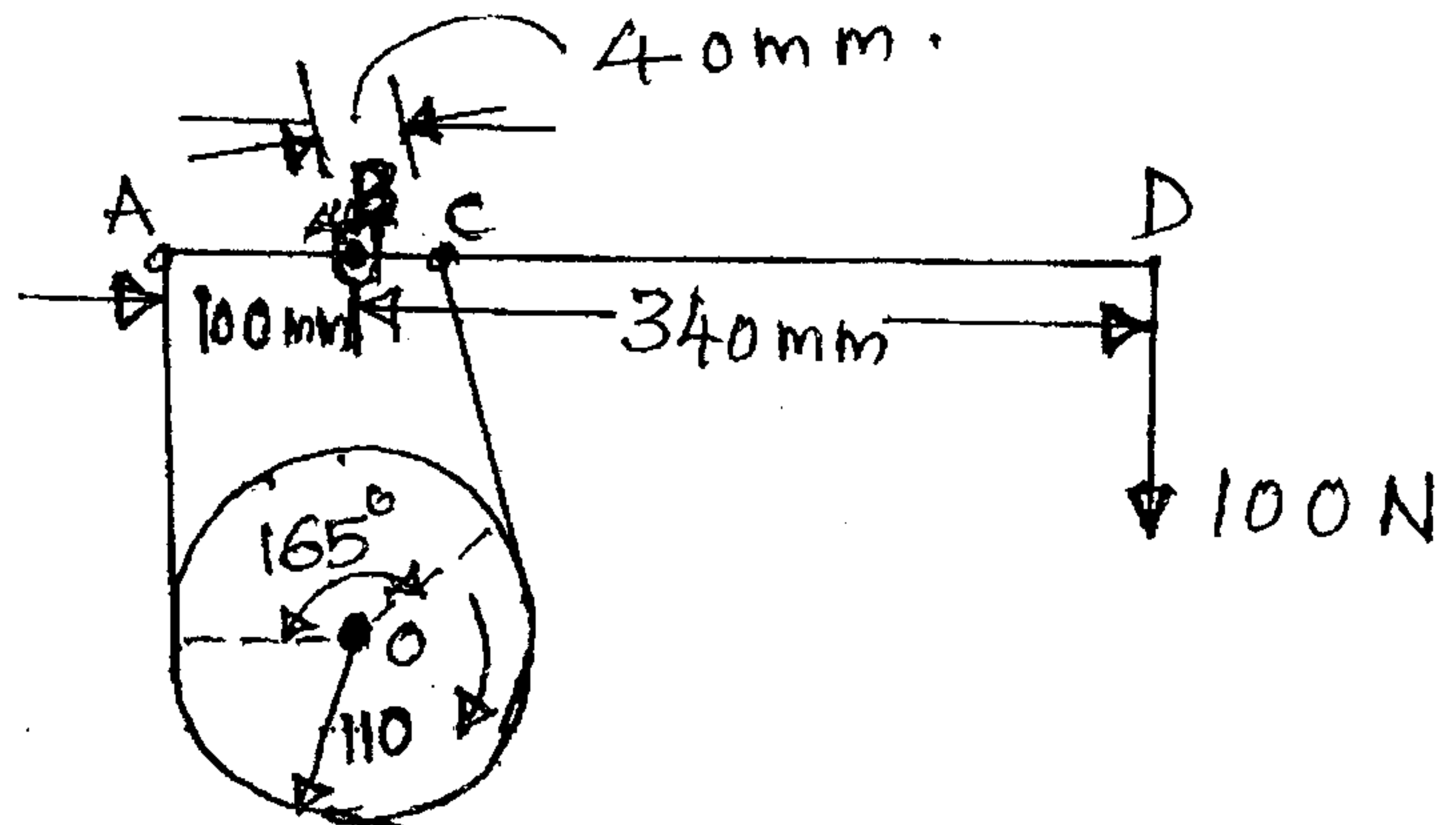




14. a) Derive  $\frac{T_n}{T_o} = \left( \frac{1 + \mu \tan \theta}{1 - \mu \tan \theta} \right)^n$ ; for band-shoe brake combination.

b) The band brake shown in fig. is applied to a shaft carrying a flywheel of mass 300 kg with a radius of gyration of 400 mm and running at 340 rpm. Find the torque applied due to a pull of 100 N if  $\mu = 0.25$ . Also find the number of revolution of the flywheel before it comes to rest.

AB = 100 mm  
BC = 40 mm  
BD = 340 mm  
Radius of brake drum = 110 mm



**Module - III**

15. Following data refer to two meshing gears having 20° involute teeth. Number of teeth on wheel = 52. Number of teeth on pinion = 20; Speed of pinion = 360 rpm, Module 8 m. If addendum of each gear is such that path of approach and recess are half of their maximum values, determine the addendum for the gear and pinion and length of arc of contact.

16. Use the following data in drawing the profile of a cam in which a knife edge follower is raised with SHM and lowered also with SHM. Least radius of cam = 60 mm, lift of follower = 45 mm. Angle of ascent = 60°, Angle of dwell between ascent and descent = 40°, angle of descent = 75°. If the cam rotates at 180 rpm, determine the maximum velocity and acceleration during ascent. **(3×20=60 Marks)**

