

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SECOND SEMESTER M.TECH DEGREE EXAMINATION, MAY 2017

Mechanical Engineering
(Machine Design)

01ME6102: Advanced Theory of Machines

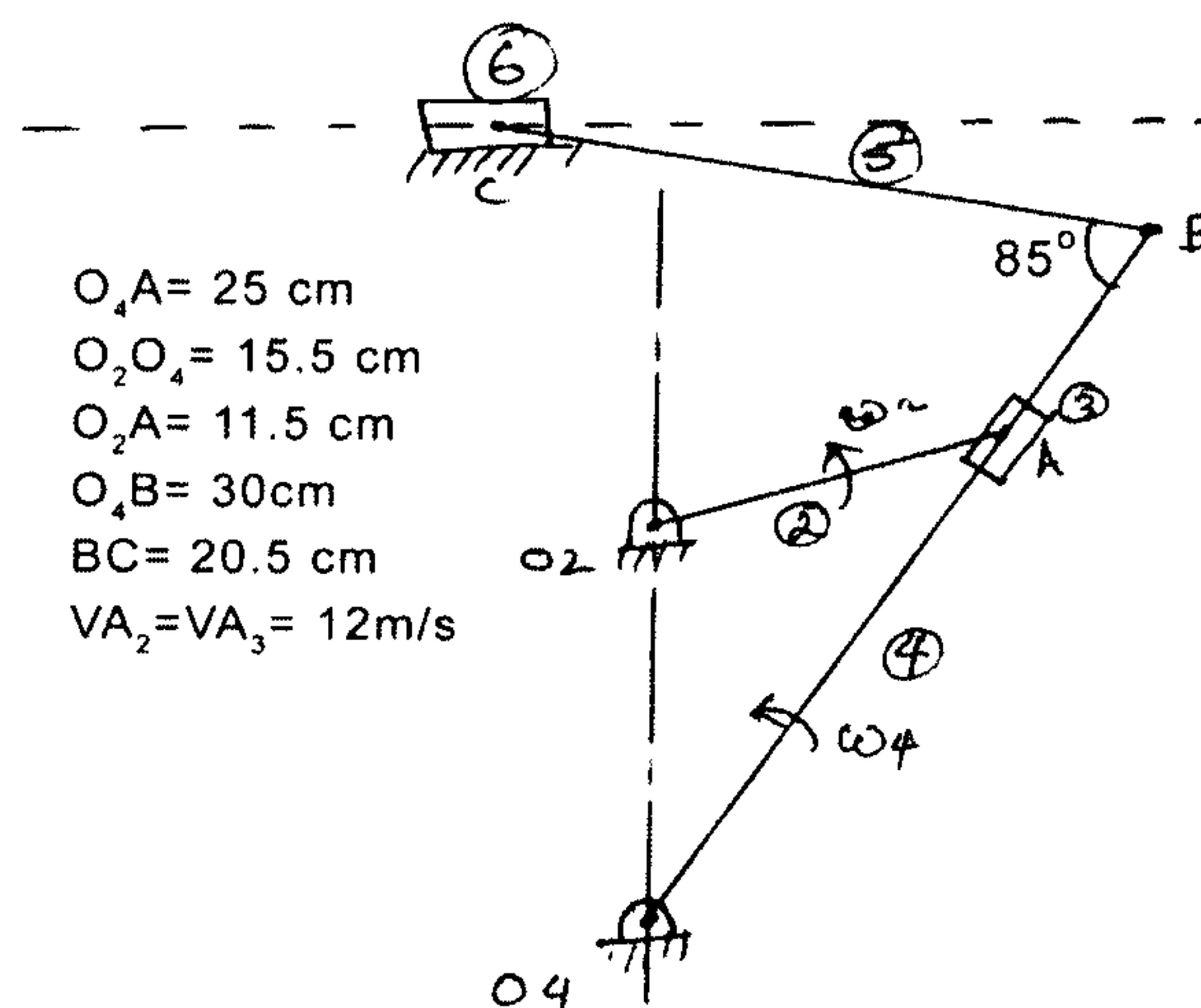
Max. Marks: 60

Duration: 3 Hours

Instructions: Answer *any two* questions from each part

Part A

1. Derive Euler-Sauvery equation for finding the centre of rotation of any point in a mechanism. (9 Marks)
2. Obtain the velocity and acceleration of the links using velocity and acceleration diagrams.



(9 Marks)

3. a) State and explain Bobilliers theorem with neat diagram (4 Marks)

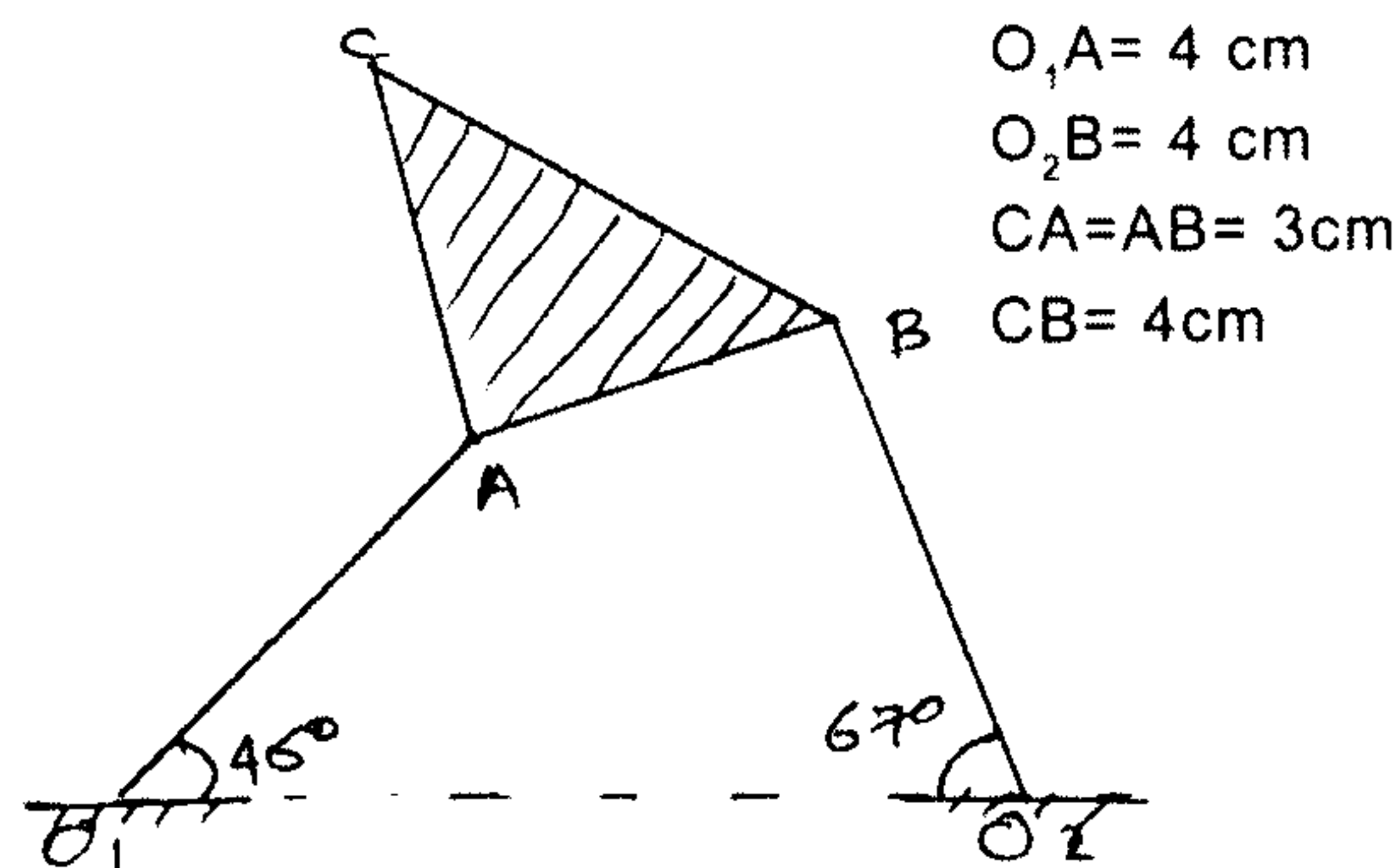
- b) With neat figures explain the concept of instantaneous circle for various motions.

(5 Marks)

P.T.O

Part B

4. Find out the conjugate linkages for the given mechanism.



(9 Marks)

5. The minimum radius, lift and nose radius of a tangent cam are 42 mm, 14 mm and 16 mm respectively. The follower axis passes through the cam axis and radius is 20 mm. Semi angle of cam is 70° . Draw the displacement, velocity and acceleration diagrams for the following motion. (9 Marks)

6. a) Explain with appropriate diagrams the concept of Polydyne Cams. (5 Marks)
b) Explain Robert Chebychev theorem for cognate linkages. (4 Marks)

Part C

7. Derive expressions for the relationship between the moments and product of inertia of a body with respect to one system of coordinate axis and those with respect to another system of coordinate axis attained by a rotation of the axis. (12 Marks)
8. Using three precision points and Chebychev spacing design a four bar mechanism to generate the function $y=e^x$ in the range $2 \leq X \leq 3$ and input angle varies from 75° to 120° and output angle varies from 85° to 130° . (12 Marks)
9. a) State and derive all the necessary conditions of a four wheel vehicle moving on a curved path. (6 Marks)
b) Discuss the factors affecting the motion of rigid body about a fixed axis. (6 Marks)