HW # 3: Mechanisms

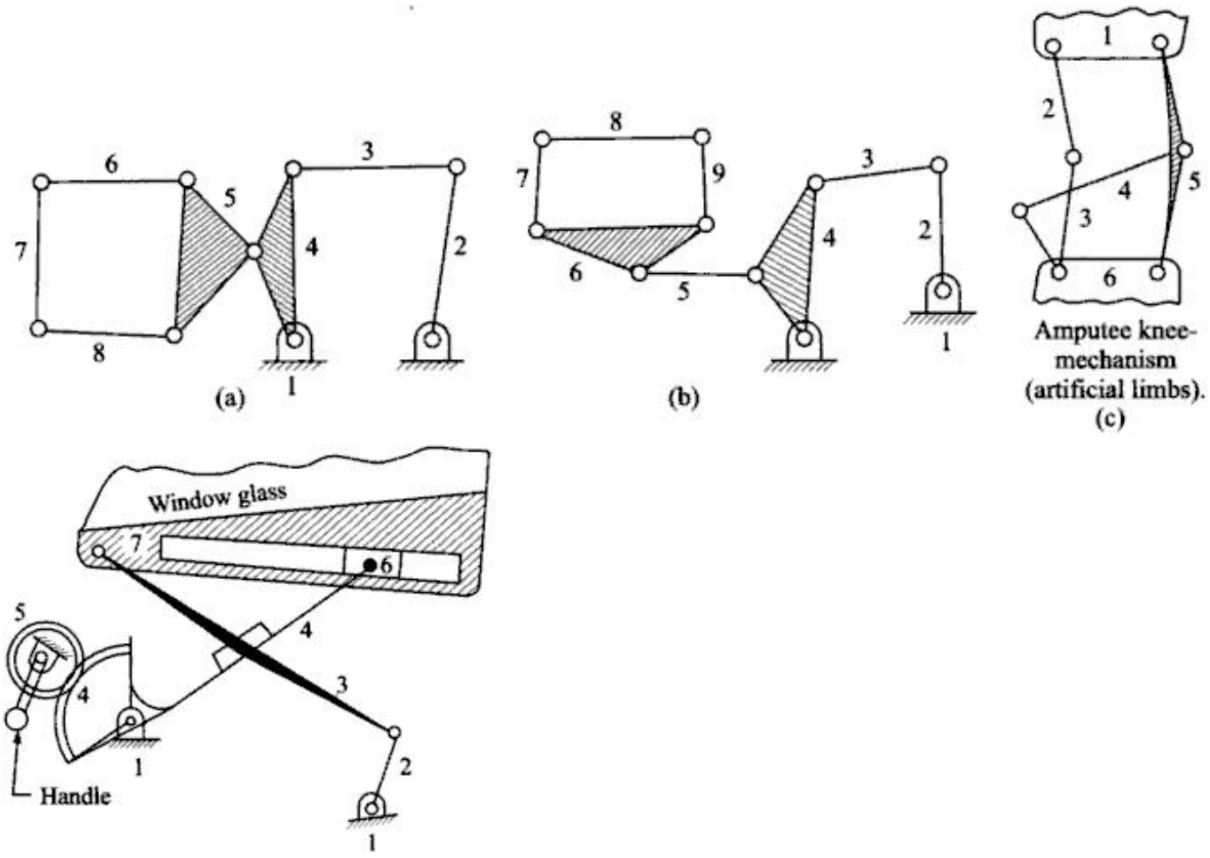

Figure 1

Q1. Calculate the degree of freedom (DOF) for the mechanisms shown in Figure 1.

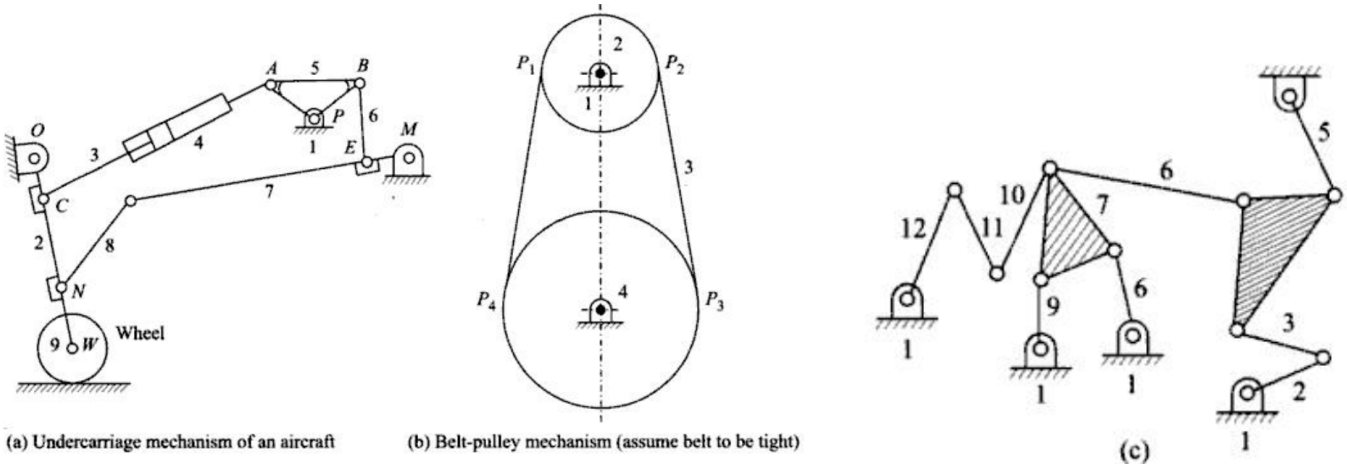

Figure 2

Q2. Calculate the DOF for the mechanisms shown in Figure 2.

Q3. Calculate the Grashof condition for the four bar mechanism having link lengths (in cm) as:

(i)	4	7	14	18
(ii)	4	8	12	16

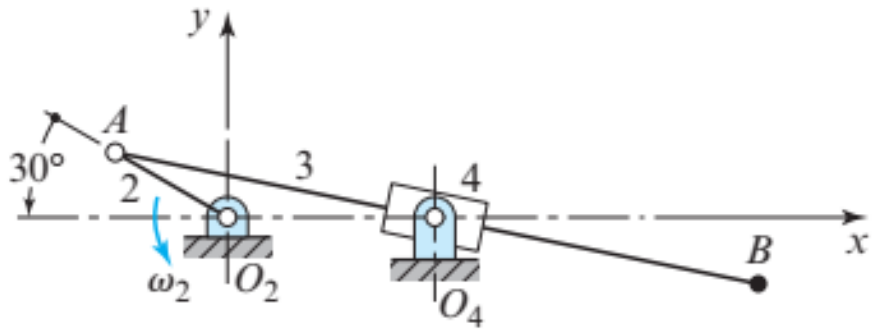

Figure 3

Q4. Crank 2 of the inverted slider-crank linkage, in the posture shown in Figure 3 , is driven at ω_2 = 60 rad/s counter clock wise (ccw) direction. The link lengths are given as AO_2 = 75 mm, BA = 400 mm, and O_4O_2 = 125 mm. Use the concept of instant centre of velocity, to find the angular velocities of links 3 and 4, and the velocity of point B.

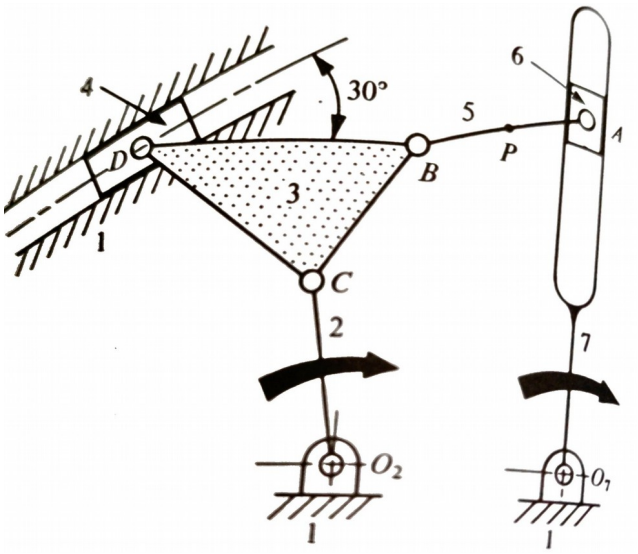

Figure 4

Q5. Figure 4 shows the kinematic representation of a machine. The slotted lever and crank O_2C are being rotated with angular velocities of 1000 rpm and 100 rpm, respectively. Find out the velocity of the midpoint P of the link AB. *Note that the numerical information is incomplete. Symbolic answer is expected.*

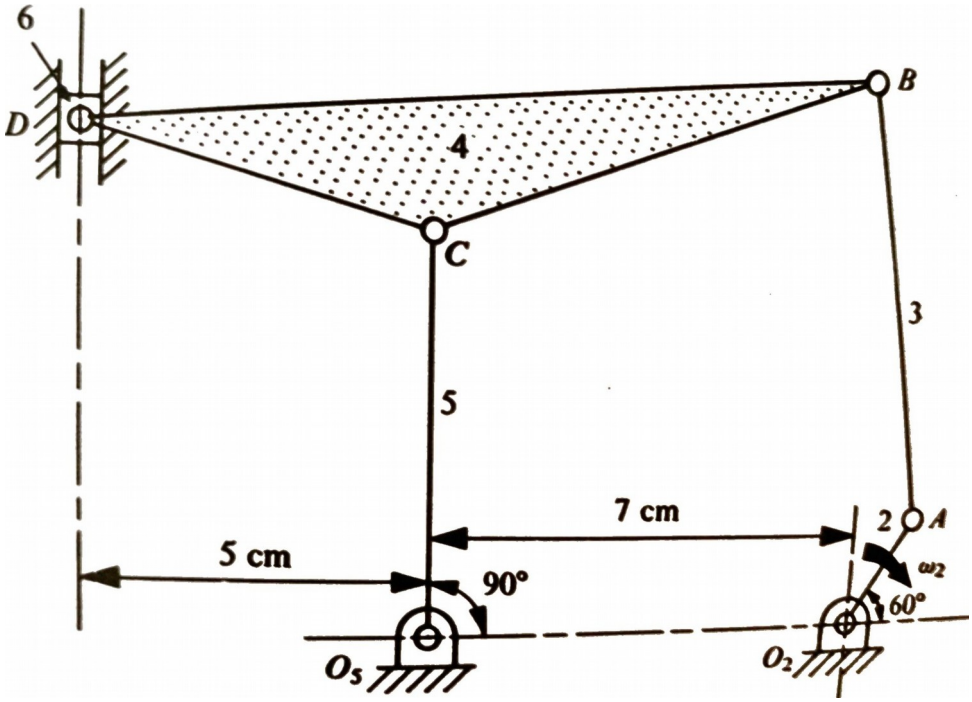

Figure 5

Q6. For the mechanism shown in Figure 5, the link lengths are O_2A = 2 cm, AB = 8.5 cm, BC = 7.5 cm, CD = 5.25 cm, and O_5C = 7 cm. Determine the velocity and acceleration of the slider if the crank O_2A rotates with a speed of 1 rad/s in a clockwise direction.