The due date for submitting this assignment has passed. Due on 2018-03-28, 23:59 IST.

Submitted assignment

1) The first link ($l_1$) of the RP manipulator shown in the figure is 1 m long. The second link slides and always maintains an angle of 60° with respect to the first link. In which condition will the manipulator reach singular configuration?

- $s = 0$ m
- $s = -1$ m
- $s = -0.5$ m
- $s = 0.5$ m

No, the answer is incorrect.
Score: 0
Accepted Answers: $s = -0.5$ m

2) The end-effector of a 2R manipulator has to trace a circular trajectory in XY plane, i.e., the coordinates of the end-effector will always satisfy $x_E(t) = (5 + 1.5 \cos t)$ ft, $y_E(t) = (4 + 1.5 \sin t)$ ft. Find the joint coordinates (i.e., $\theta_1(t), \theta_2(t)$) at $t = \pi/3$ s. Given...
1) The end-effector of a 2R manipulator has following velocity components: $\dot{x}_E = u$, $\dot{y}_E = 0$ when it has reached a point $(2\sqrt{3},4)$ in its work-space. The operator has set a limit on the motor-controller such that the first link operates in the range of $-45^\circ \leq \theta_1 \leq 45^\circ$. Find the joint velocities (i.e., $\dot{\theta}_1$, $\dot{\theta}_2$) at that instant assuming $l_1 = 4$, $l_2 = 2$.

- $\dot{\theta}_1 = u_0/2$, $\dot{\theta}_2 = u_0/2$
- $\dot{\theta}_1 = -u_0/2$, $\dot{\theta}_2 = 0$
- $\dot{\theta}_1 = -u_0/2$, $\dot{\theta}_2 = -u_0/2$
- $\dot{\theta}_1 = 0$, $\dot{\theta}_2 = -u_0/2$

No, the answer is incorrect.
Score: 0
Accepted Answers:
- $(33.28^\circ, 25.16^\circ)$ or $(52.06^\circ, -25.16^\circ)$

2) Link CB of a 4 bar mechanism rotates counter clockwise (CCW) at an angular speed of 2 rad/s with an angular acceleration of 0.1 rad/s$^2$ (CCW) at the instant shown in the figure. Compute the
angular acceleration of link OA for the given instant of the mechanism.

![Diagram of mechanism](image)

- 4.36 rad/s² (CW)
- 1.59 rad/s² (CW)
- 4.36 rad/s² (CCW)
- 1.59 rad/s² (CCW)

No, the answer is incorrect.
Score: 0
Accepted Answers:
4.36 rad/s² (CW)

5) Link OA of the 4R chain starts from rest from the given configuration shown in the figure with an initial acceleration of 0.2 rad/s² (CCW). Initial angular acceleration of link BC is ____.

![Diagram of mechanism](image)

- 0.2 rad/s² (CW)
- 0.1 rad/s² (CCW)
- 0.707 rad/s² (CCW)
- 0.1 rad/s² (CW)

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.2 rad/s² (CW)

6) In the current configuration of the mechanism shown below, 1 point
∠CAB=90°. If CA= 3 cm, AB= 4 cm and \( \omega_2 = 4 \text{ rad/s (CCW)} \) (constant), the angular
acceleration of link BC is ____ rad/s².

8 (CW)
12 (CW)
4 (CCW)
10 (CCW)

No, the answer is incorrect.
Score: 0
Accepted Answers:
12 (CW)

7) The mechanism shown in the figure is in one of the dead-center configurations where CD = 3 cm, BD = 4 cm and CA = 2 cm. If \( \omega_2 = 2 \text{ rad/s} \) (constant), the angular acceleration of the link DB is ____ rad/s².

\[ \omega_2 = 2 \text{ rad/s} \]

2.083
4.167
5.556
2.778

No, the answer is incorrect.
Score: 0
Accepted Answers:
5.556

8)
Find $\ddot{l}$ of the mechanism at the instant shown in the figure with the given data set.

$\theta = 60^\circ$, $\dot{\theta} = 3 \text{ rad/s (CCW)}$, $\ddot{\theta} = 0.2 \text{ rad/s}^2 (\text{CCW})$.

![Mechanism Diagram]

- 10.1 cm/s$^2$
- -20.4 cm/s$^2$
- -8.21 cm/s$^2$
- 16.15 cm/s$^2$

No, the answer is incorrect.
Score: 0
Accepted Answers:

16.15 cm/s$^2$

9) The slider of a slider-crank mechanism shown in the figure moves at a speed of 45 mm/s with an acceleration of 24.84375 mm/s$^2$. The direction of acceleration is same with that of the speed. Find angular acceleration of link OA at that given instant.

![Slider-Crank Mechanism Diagram]

- 17.31 mm/s$^2$ (CW)
- 0 mm/s$^2$
- 9 mm/s$^2$ (CCW)
- 9 mm/s$^2$ (CW)

No, the answer is incorrect.
Score: 0
Accepted Answers:

0 mm/s$^2$

10) What will be the initial acceleration of the table shown in the figure when point A is pushed (from rest) with a constant acceleration of $a = 0.1 \text{ m/s}^2$. Assume initial value

https://onlinecourses.nptel.ac.in/noc18_me18/unit?unit=11&assessment=102
of $\theta$ is $30^\circ$ and $L = 1$ m.

- $0.75 \text{ m/s}^2$
- $0.09 \text{ m/s}^2$
- $0.18 \text{ m/s}^2$
- $-0.09 \text{ m/s}^2$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$0.75 \text{ m/s}^2$