# Unit 6 - Week 5



## Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-04, 23:59 IST.

1) The position vector of a particle is given as a functions time: $\mathbf{r}(t) = (C_1 + C_2 t + C_3 t^2)\,\hat{\mathbf{i}} + C_4 t\,\hat{\mathbf{j}}$, where $C_1 = 1$ m/s, $C_2 = 3$ m/s, $C_3 = 3$ m/s$^2$ and $C_4 = 2$ m/s. The acceleration of the particle (in m/s$^2$) at $t = 2$ s will be

1 point

No, the answer is incorrect.
Score: 0
Accepted Answers:
*(Type: Range) 35,37*

2) At any instant the horizontal position of the weather balloon in Figure 1 is defined by $x = (2t)$ m, where $t$ is in seconds. If the equation of the path is $y = x^2/5$

then the magnitude of the acceleration (in m/s$^2$) at $t = 2$ s is

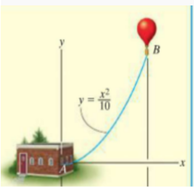


Figure 1: Figure for question No.2

1 point

No, the answer is incorrect.
Score: 0
Accepted Answers:
*(Type: Range) 1.4,1.8*

3) A jet plane flying at a constant speed $v$ at an altitude $h = 10$ km is being tracked by radar located at $O$ directly below the line of flight (see Figure 2).

If the angle $\theta$ is decreasing at the rate of 0.020 rad/s then the magnitude of the velocity **v** of the plane (in Km/hours) when $\theta = 60^0$ will be

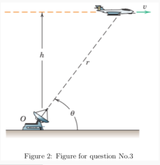


Figure 2: Figure for question No.3

1 point

No, the answer is incorrect.
Score: 0
Accepted Answers:
*(Type: Range) 950,970*

4) Bar $OA$ has Bar OA has a counterclockwise angular velocity $\omega_0 = 2$ rad/s. Rod $BC$ slides freely through the pivoted collar attached to $OA$ (see Figure 3).

The angular speed $\omega_{BC}$ of rod $BC$ is

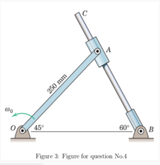


Figure 3: Figure for question No.4

1 point

No, the answer is incorrect.
Score: 0
Accepted Answers:
*(Type: Range) 0.4,0.8*

5) For the short interval, collars $A$ and $B$ are sliding along the fixed vertical shaft with velocities $v_A = 2$ m/s and $v_B = 3$ m/s in the directions shown in Figure 4.

The magnitude of the velocity of point $C$ for the position $\theta = 60^0$ is

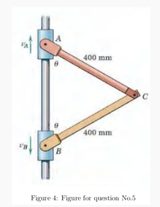


Figure 4: Figure for question No.5

1 point

No, the answer is incorrect.
Score: 0
Accepted Answers:
*(Type: Range) 1,2*

6) right-angle bar rotates clockwise with an angular velocity which is decreasing at the rate of 4 rad/s$^2$ (see Figure 6). The magnitude of acceleration of point

1 point

$A$ when $\omega = 2$ rad/s is

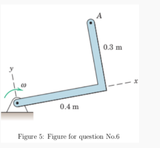


Figure 5: Figure for question No.6

- 2.83 m/s$^2$
- 0.83 m/s$^2$
- 4.83 m/s$^2$
- 6.83 m/s$^2$

No, the answer is incorrect.
Score: 0
Accepted Answers:
*2.83 m/s$^2$*

7) In relation to Figure (6), at the instant when $x_A = .85L$, the velocity of the slider at $A$ is $v = 2$ m/s to the right. The angular speed $\omega$ of bar $AB$ if $L = 0.8$ m is

1 point

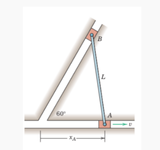


Figure 6: Figure for question No.7

- 0.2 rad/s
- 5.2 rad/s
- 3.2 rad/s
- 1.2 rad/s

No, the answer is incorrect.
Score: 0
Accepted Answers:
*3.2 rad/s*

8) The cylinder shown in Figure (7) rolls without slipping between the two moving plates $E$ and $D$. The angular velocity of the cylinder is

1 point

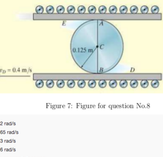


Figure 7: Figure for question No.8

- 5.2 rad/s
- 0.65 rad/s
- 1.3 rad/s
- 2.6 rad/s

No, the answer is incorrect.
Score: 0
Accepted Answers:
*2.6 rad/s*

9) The wheel of radius $r = 300$ mm rolls to the right without slipping and has a velocity $v_O = 3$ m/s of its center $O$ as shown in Figure (8). The velocity of

1 point

point $A$ on the wheel for the instant represented is

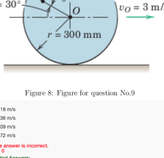


Figure 8: Figure for question No.9

- 2.18 m/s
- 4.36 m/s
- 1.09 m/s
- 8.72 m/s

No, the answer is incorrect.
Score: 0
Accepted Answers:
*4.36 m/s*

10) Roller $B$ of the linkage has a velocity of 0.75 m/s to the right as the angle $\theta$ passes 60$^0$ and bar $AB$ also makes an angle of 60$^0$ with the horizontal (see Figure 9). The angular speed of bar $\omega_{AB}$ is

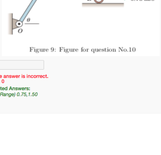


Figure 9: Figure for question No.10

No, the answer is incorrect.
Score: 0
Accepted Answers:
*(Type: Range) 0.75,1.50*

1 point