Student	First Name	Last Name
1	Apoorv	SOMKUWAR
2	Akash	SHARMA
3	Rodrigo	GUILHERME
4	Raphaël	AUBRY

QUESTION #1

Answer #1

Numerical values of coefficients a_0, a_1 and b_1 of the motion equation.

Do not forget the unit + 3 figures after the coma.

a_0 =	0.961 s^-1
a_1 =	0.949 s^-1
b_0 =	0.666 s^-1

Answer #2

Numerical values in rad and ° for $\beta(0^-)$

$\beta(0^-)$ =	-0.269 rad ~ 15.44°

Answer #3

The ODE to be solved just after the reversal is : $\ddot{\boldsymbol{\beta}} + \boldsymbol{a_1}\dot{\boldsymbol{\beta}} + \boldsymbol{a_0}\boldsymbol{\beta} = \boldsymbol{c_0}$

Two boundary conditions are associated with this ODE

Numerical values for c_0 and the boundary conditions. Do not forget the unit + 3 figures after the coma.

c_0 =	0.256
$\beta(0^+)$ =	-0.269 rad
$d\beta/dt(0^+)$ =	0 rad/s

QUESTION #2

Answer #4

Numerical value for the discriminant Δ, which is strictly negative.

Δ =	-2.87

Answer #5

Numerical value for r and s. Do not forget the unit + 3 figures after the coma.

r =	-0.481
s =	0.848

Answer #6

Numerical value for C_1 and C_2. Do not forget the unit + 3 figures after the coma.

C_1 =	-0.539 rad
C_2 =	-0.305 rad

Answer #7

Literal expressions for t_k and β_k.

t_k =	3.706k
β_k =	0.269 - (-1)^k * 0.539exp(-1.781k)

Answer #8

Numerical values for t_k and β_k k=0,1,2.

t_0 =	0
t_1 =	3.706
t_3 =	7.412
β_0 =	-15.43
β_1 =	20.64
β_2 =	14.56

QUESTION #3

Answer #9

Numerical values to fill the following table.

t in s	0^-	0^+	3.706
β in rad	-0.269	-0.269	0.360
δ_n in rad	-0.384	0.384	0.384
$R_{y,\beta}$ in N	56976	56976	-71171
$R_{y,\delta}$ in N	-38728	38728	38728
R_y in N	18248	95704	-37443

QUESTION #4

Answer #10

Numerical values for the coefficients appearing in the expression for M_c.

$$M_c = a\dot{\beta} + b\beta - c\delta_n$$

a = 666

b = 4892

c = 17856

Answer #11

Numerical values to fill the following table.

t in s	0^-	0^+	t_1=
b in rad	-0.269	-0.269	0.360
δ_n in rad	-0.384	0.384	0.384
M_c in Nm	5538	-8174	-5094

QUESTION #5

Answer #12

Numerical values for the coefficients appearing in the expression for δ_n.

$$\boldsymbol{\delta_n = a + b\dot{\beta} + c\beta}$$

a = 0.412

b = 0.037

c = 0.274

Answer #13

Numerical values for the coefficients appearing in the new motion equation.

$$\boldsymbol{\ddot{\beta} + a\dot{\beta} + b\beta = c}$$

a = 0.936

b = 0.767

c = 0.275

Answer #14

Expressions of b and db/dt including numerical expressions of coefficients involved.

$\beta =$ 0.358 - exp(-0.468t) * (0.627cos0.740t + 0.397sin0.740t)

$d\beta/dt =$ 0.650*exp(-0.468t) * sin0.740t