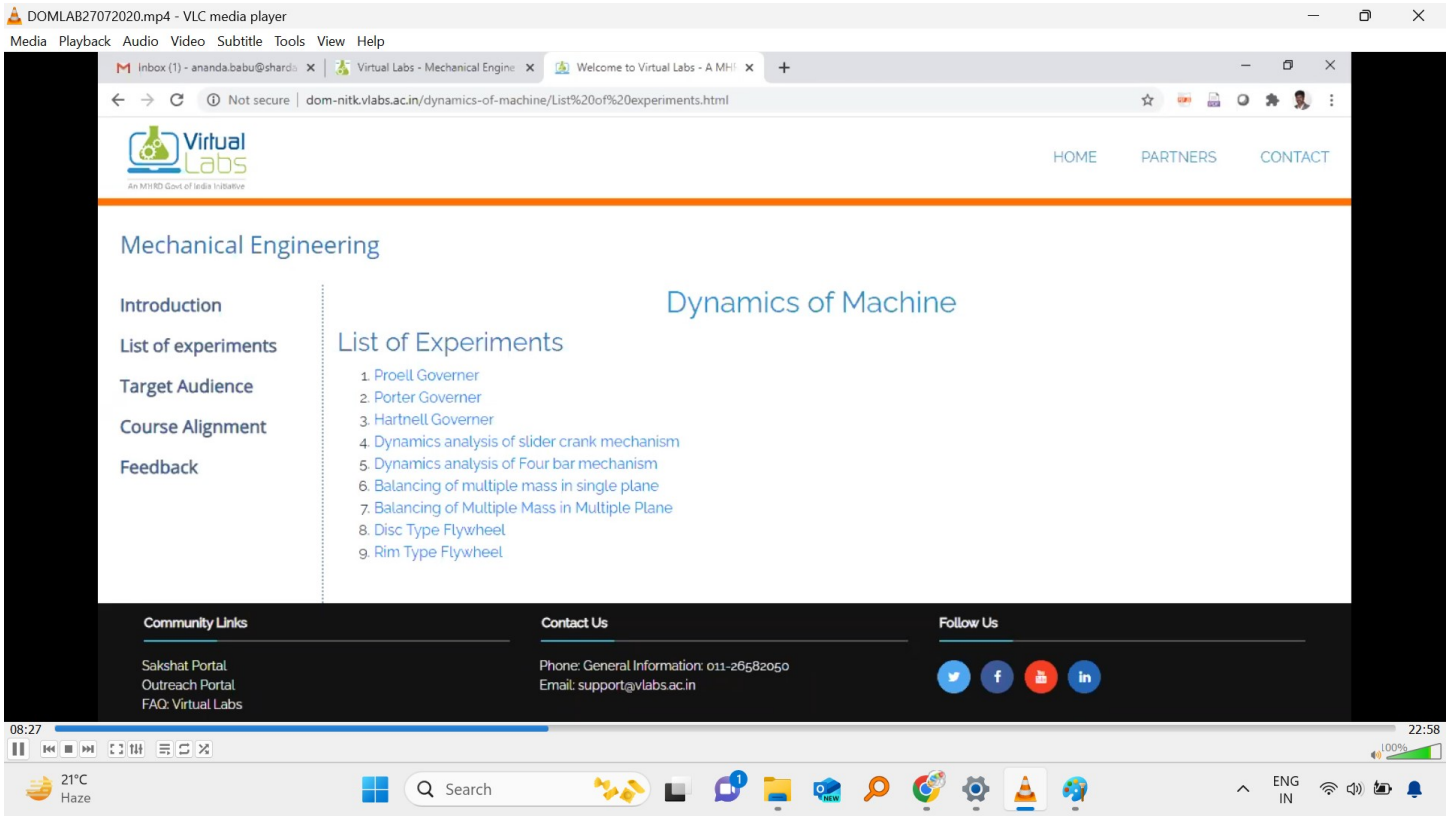
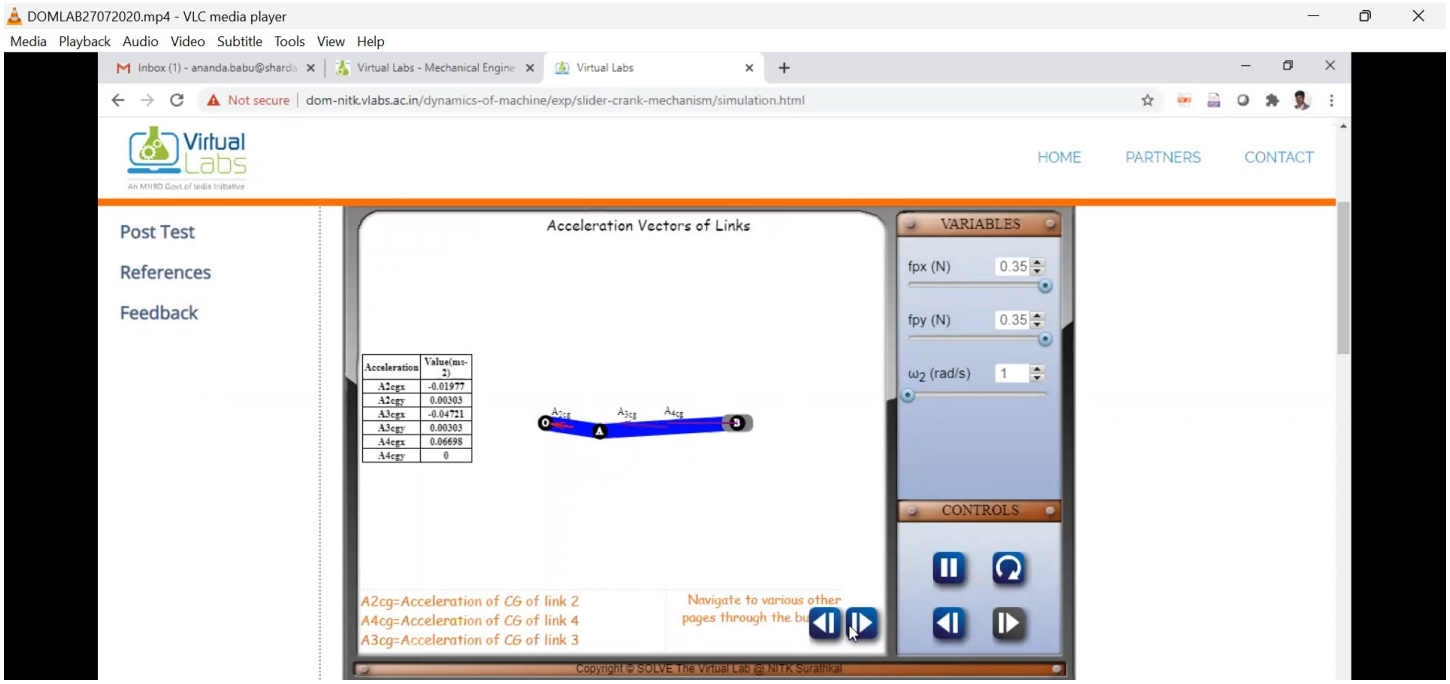
Dynamics of Machines Laboratory MEP320 **Using vlab (MHRD)** **https://www.vlab.co.in/broad-area-mechanical-engineering** **Faculty member: Dr Ananda Babu**		
School: SET		**Batch: 2018-2022**
Program: B. Tech		**Current Academic Year: 2020-2021**
Branch: ALL		**Semester: V**
1	Course Code	MEP320
2	Course Title	Dynamics of Machinery Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	The course covers the procedures needed to develop the concepts related to precision measurement, inspection and analysis of dynamic behaviour of system
6	Course Outcomes	After successful completion of this course the student will be able to CO1: Analyze and design centrifugal governors CO2: Demonstrate the gyroscopic effects in ships, aero-planes and road vehicles. CO3: Analyze balancing problems in rotating and reciprocating machinery. CO4: Demonstrate free and forced vibrations of single degree freedom systems CO5: Evaluate frequency vibration of two rotor system. CO6: Interpret the dynamic characteristics of mechanical system.
7	Course Description	The course covers the procedures needed to develop the concepts related to precision measurement, inspection and analysis of dynamic behaviour of system

8	Outline syllabus				CO Mapping
	List of Experiments				
	Experiment 1	To perform experiment on watt governor to prepare performance characteristics curve			CO1, CO6
	Experiment 2	To perform experiment on Porter governor to prepare performance characteristics curve			CO1, CO6
	Experiment 3	To perform experiment on Proell governor to prepare performance characteristics curve			CO1, CO6
	Experiment 4	Observation of gyroscopic behavior. And experimental justification of the equation C= I.ω.ωp for calculating the gyroscopic couple by observation and measurements of result for independent variation in applied couple C and precession ωp			CO2, CO6
	Experiment 5	To obtain balancing mass for the rotating mass system.			CO3, CO6
	Experiment 6	To study whirling phenomenon in shaft and observe various modes of Vibrations.			CO4, CO6
	Experiment 7	To determine the radius of gyration of compound pendulum and compare with theoretical value.			CO4, CO6
	Experiment 8	To study the free vibration and to determine the natural frequency of vibration of two-rotor system.			CO4, CO6
	Experiment 9	To verify the relation $T=2\pi\sqrt{L/g}$ Where T- Periodic time in sec. and L- Length of pendulum in cm.			CO4, CO6
	Experiment 10	To study the longitudinal vibrations of helical spring and to determine the frequency or period of vibration (oscillation) theoretically and actually by experiment.			CO4, CO6
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	Handouts given by the instructor			

CO-PO Mapping															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3		3							2	1	1	
CO2	3	3	3		3							2	1	1	
CO3	3	3	3		3							2	1	1	
CO4	3	3	3		3							2	1	1	
CO5	3	3	3		3							2	1	1	
CO6	3	3	3		3							2	1	1	

	Software	-


DOMLAB27072020.mp4 - VLC media player
Media Playback Audio Video Subtitle Tools View Help
Inbox (1) - ananda.babu@sharda
Virtual Labs - Mechanical Engine
Welcome to Virtual Labs - A MHR
Not secure | dom-nitk.vlabs.ac.in/dynamics-of-machine/List%20of%20experiments.html
Virtual Labs
An MHRD Govt of India Initiative
HOME
PARTNERS
CONTACT
Mechanical Engineering
Introduction
List of experiments
Target Audience
Course Alignment
Feedback
Dynamics of Machine
List of Experiments
1. Proell Governer
2. Porter Governer
3. Hartnell Governer
4. Dynamics analysis of slider crank mechanism
5. Dynamics analysis of Four bar mechanism
6. Balancing of multiple mass in single plane
7. Balancing of Multiple Mass in Multiple Plane
8. Disc Type Flywheel
9. Rim Type Flywheel
Community Links
Sakshat Portal
Outreach Portal
FAQ: Virtual Labs
Contact Us
Phone: General Information: 011-26582050
Email: support@vlabs.ac.in
Follow Us
08:27
22:58
100%
21°C
Haze
Search
ENG
IN


DOMLAB27072020.mp4 - VLC media player
Media Playback Audio Video Subtitle Tools View Help
Not secure | dom-nitk.vlabs.ac.in/dynamics-of-machine/exp/slider-crank-mechanism/simulation.html
Virtual Labs
An MHRD Govt of India Initiative
HOME
PARTNERS
CONTACT
Post Test
References
Feedback
Acceleration Vectors of Links
Acceleration | Value(mts-2)
A2cgx | -0.01977
A2cgy | 0.00303
A3cgx | -0.04721
A3cgy | 0.00303
A4cgx | 0.06698
A4cgy | 0
A2cg=Acceleration of CG of link 2
A4cg=Acceleration of CG of link 4
A3cg=Acceleration of CG of link 3
Navigate to various other pages through the bu
VARIABLES
fpx (N) 0.35
fpy (N) 0.35
ω2 (rad/s) 1
CONTROLS
Copyright © SOLVE The Virtual Lab @ NITK Surathkal

DOMLAB30072020.mp4 - VLC media player

Media Playback Audio Video Subtitle Tools View Help

dom-nitk.vlabs.ac.in/dynamics-of-machine/exp/porter-governer/simulation.html

Virtual Labs

An MHRD Govt of India Initiative

HOME PARTNERS CONTACT

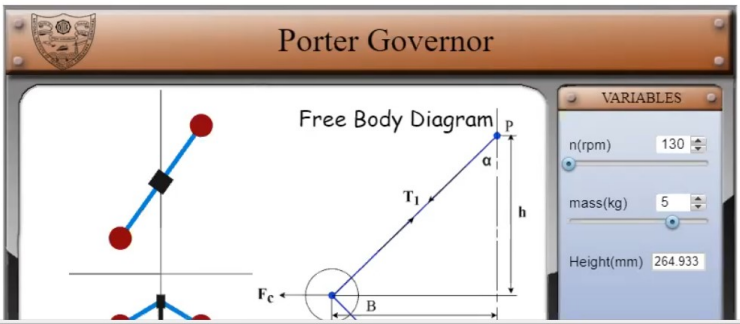
Mechanical Engineering > Dynamics of Machine > Experiments >

- Aim
- Theory
- Pre Test
- Procedure
- Simulation
- Post Test
- References
- Feedback

Porter Governor

Simulation

Pop Up Procedure



00:42

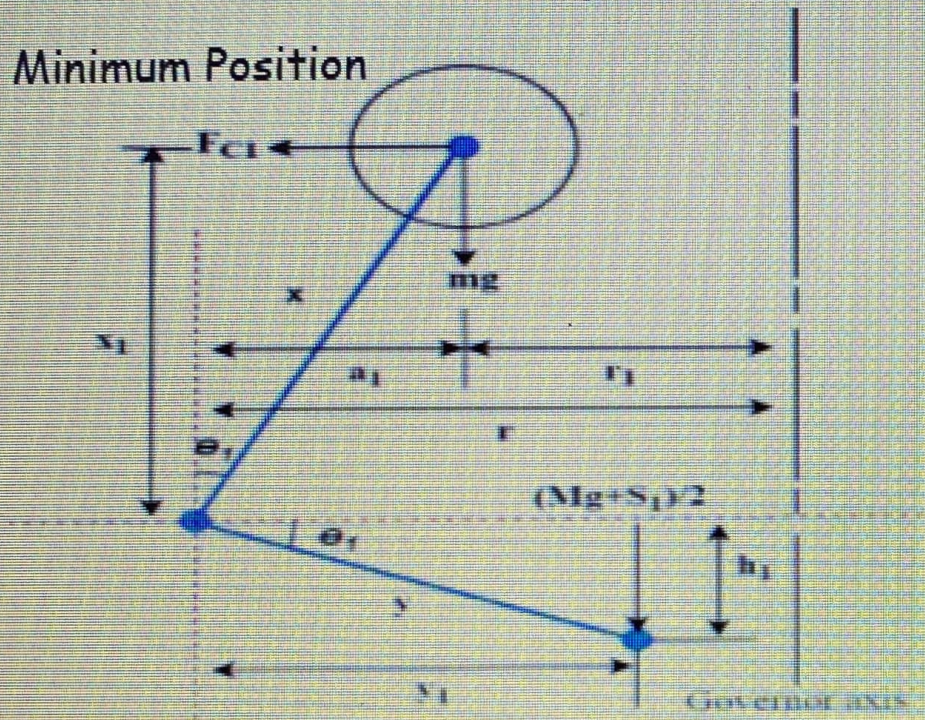
Show desktop

21°C Haze

Search

ENG IN

Free Body Diagram



Stiffness of Spring(N/mm): CHECK

Radius of Rotation(mm): CHECK

Lift of Sleeve(mm): CHECK

Constant Variables:

X & Y = 90mm w_1 = 38rad/s w_2 = 42rad/s

r= 90mm r_1 = 70mm r_2 = 110mm

VARIABLES

m (kg) 5

n (rpm) 391

CONTROLS

Free Body Diagram

- (•) Minimum Position
- ( ) Maximum Position

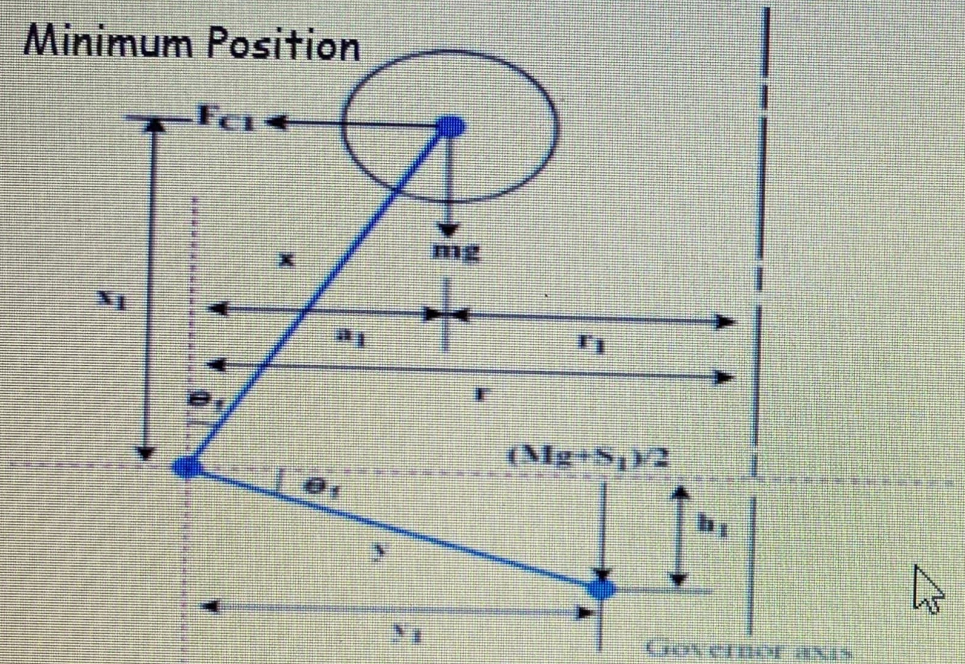
Exit Experiment

Reset Experiment

Copyright © SOLVE The Virtual Lab @ NITK Surathkal

Free Body Diagram

Minimum Position



Stiffness of Spring(N/mm): 23.24 ✓ CHECK

Radius of Rotation(mm): CHECK

Lift of Sleeve(mm): CHECK

Constant Variables:

X & Y = 90mm w_1 = 38rad/s w_2 = 42rad/s

r= 90mm r_1 = 70mm r_2 = 110mm

VARIABLES

m (kg) 5

n (rpm) 391

CONTROLS

Free Body Diagram

- (•) Minimum Position
- ( ) Maximum Position

Exit Experiment

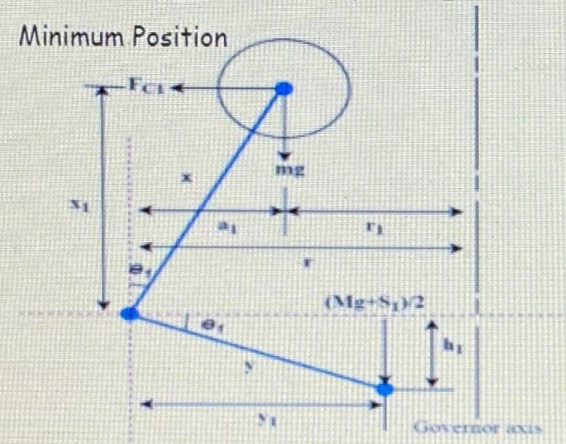
Reset Experiment

Copyright © SOLVE The Virtual Lab @ NITK Surathkal

Virtual Labs
An MHRD Govt of India Initiative

Free Body Diagram

Minimum Position



Stiffness of Spring(N/mm): 23.24 ✓ CHECK

Radius of Rotation(mm): 95.135 ✓ CHECK

Lift of Sleeve(mm): CHECK

Constant Variables:

X & Y = 90mm ω_1 = 38rad/s ω_2 = 42rad/s

r= 90mm r_1 = 70mm r_2 = 110mm

VARIABLES

m (kg) 5

n (rpm) 391

CONTROLS

Free Body Diagram

- (•) Minimum Position
- ( ) Maximum Position

Exit Experiment

Reset Experiment

Copyright © SOLVE The Virtual Lab @ NITK Surathkal

Activate Windows
Go to Settings to activate Windows.

Name:- Himanshu Choudhary.

Roll No. :- 18010601 3.

System I.d:- 2018010012.

Hartnell Governor.

* Finding Stiffness of spring.

$$S = \frac{S_2 - S_1}{h} = 2\frac{F_{c_2} - F_{c_1}}{r_2 - r_1}\left(\frac{x}{y}\right)^2$$

$F_{c_1} = m\omega_1^2 r_1$

$F_{c_1} = 5 \times 38^2 \times (70 \times 10^{-3})$

$F_{c_1} = 505.4\,N$

$F_{c_2} = m\omega_2^2 r_2$

$F_{c_1} = 5 \times 42^2 \times (110 \times 10^{-3})$

$F_{c_1} = 970.2\,N$

$$S = \frac{2(970.2 - 505.4)}{110 - 70}\,\frac{90}{90}$$

$$\boxed{S = 23.24\ N/mm^2}$$

finding radius of rotation.

$$r_2 = \frac{F_{C_1} r_2 - F_{C_2} r_1}{m\omega^2(r_2 - r_1) + (F_{C_1} - F_{C_2})}$$

$$\omega = \frac{2\pi N}{60}$$

$$\omega = \frac{2\pi \times 391}{60}$$

$$\omega = 40.945 \text{ rad/s}.$$

$$r_2 = \frac{505.4 \times (110 \times 10^{-3}) - 970.2 \times (70 \times 10^{-3})}{5 \times (40.945)^2 [(110 \times 10^{-3}) - (70 \times 10^{-3})] + (505.4 - 970.2)}$$

$$r = \frac{-12.32}{-129.50}$$

$$r_2 = 0.095135 \text{ m}$$

$$\boxed{r_2 = 95.135 \text{ mm}.}$$

① Proell Governer

$$N^2 = \frac{FM}{BM}\left[\frac{m+M}{m}\right]\frac{895}{h}$$

$$\frac{FM}{BM} = 0.5$$

$M = 20\,kg$ $\qquad$ $m = 5\,kg$

$height = 169.276$

Now

$$N^2 = 0.5\left(5\right) \times \frac{895}{169.276 \times 10^{-3}}$$

$$\Rightarrow \quad 114.766 \sim 115\,rpm$$

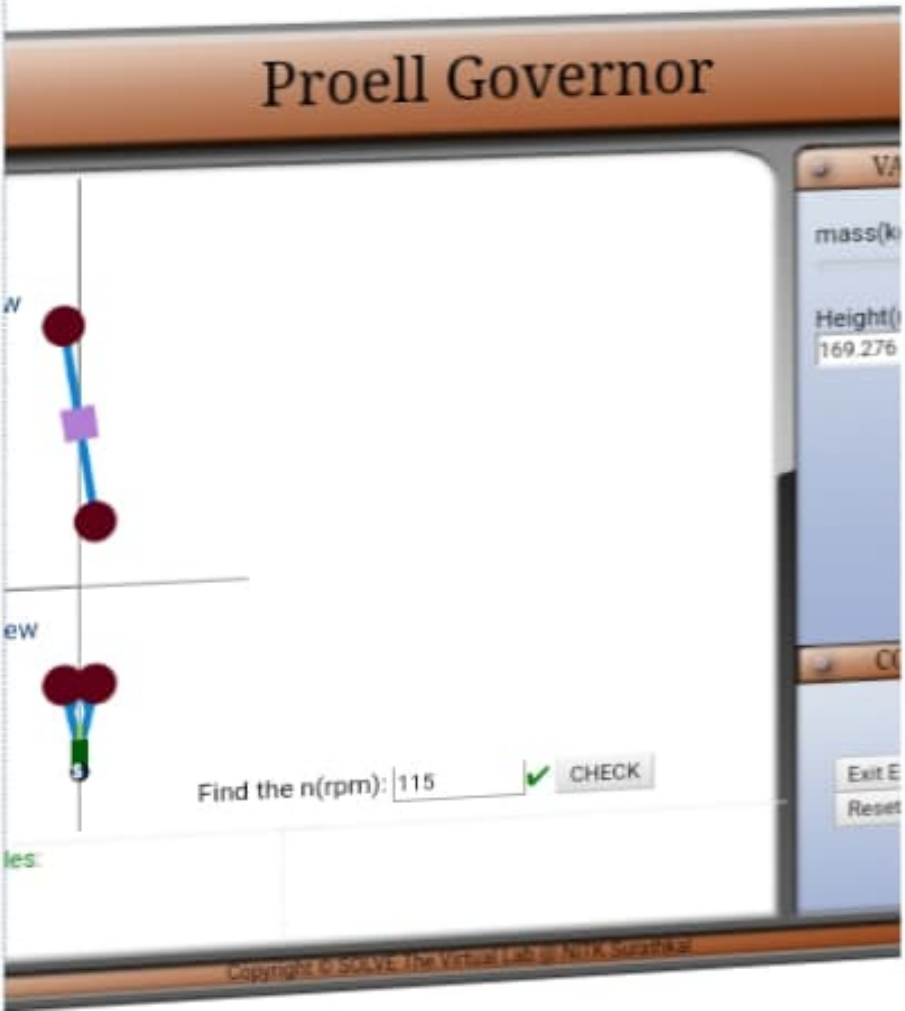
Shot on Y12
Vivo AI camera

4G 16:10 25

Virtual Labs
dom-nitk.vlabs.ac.in

Proell Governor

Pop Up Procedure



Shot on Y12

discrete
Date
Page

Porter Governer

Aim:- To visualize the working and effect of speed change of porter governor through simulation.

$$N^2 = \frac{m+M}{m} \times \frac{895}{h}$$

$M = 20\ kg$

$n(rpm) = 130$

$m = 4\ kg$

$h = ?$

$$N^2 = \frac{4+20}{4} \times \frac{895}{h}$$

$$(130)^2 = \frac{24}{4} \times \frac{895}{h}$$

$$16900 = 6 \times \frac{895}{h}$$

$$h = \frac{895 \times 6}{16900}$$

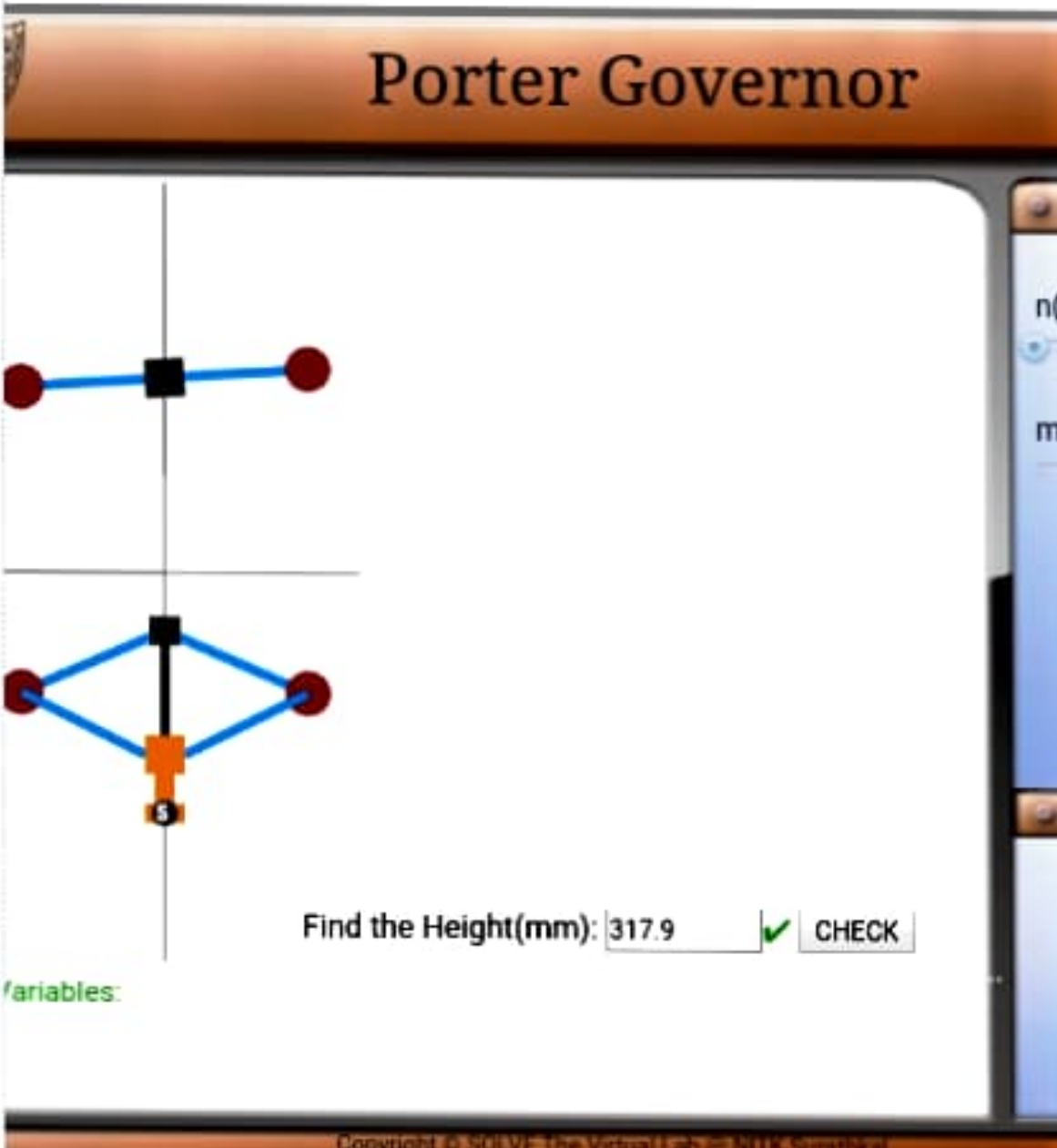
$$= 0.31775\ m$$

$$\doteq 317.7$$

Porter Governor

ion

Pop Up Procedure



Hartnell governer.

To visualize the working and effect of speed change of hartnell governer through simulation.

$M = 6$ kg $\omega_1 = 38$ rad/sec

$N = 397$ rpm $\omega_2 = 42$ rad/sec

$\omega = \frac{2\pi N}{60} = 40.52$ rad/sec

x and y = 90mm $r_1 = 70$mm $r_2 = 110$mm

Stiffness

$$(S) = \frac{2(FC_2 - FC_1)}{r_2 - r_1} \times \frac{x}{y}$$

$FC_1 = m_1 r_1 \omega_1^2$

$= 6 \times 70 \times 10^{-3} \times (38)^2$

$= 606.48$

$FC_2 = m r_2 \omega_2^2$

$= 6 \times 110 \times 10^{-3} \times 42^2$

$= 1164.24$

Now,

$$S = \frac{2(776.16 - 404.32) \times 1}{110 - 70}$$

$\Rightarrow 27.89$ N/mm²

$$(\gamma) \Rightarrow \frac{fc_1 r_2 - fc_2 r_1}{m\omega^2 (r_2 - r_1) + (fc_1 - fc_2)}$$

$$\Rightarrow \frac{606.48 \times 110 \times 10^{-3} - 776.16 \times 70 \times 10^{-3}}{6 \times (41.78)^2 \times [110 \times 10^{-3} - 70 \times 10^{-3}] + (606.48 - 776.16)}$$

$$\Rightarrow 90.16 \text{ mm}$$

$$106.822 \text{ mm}$$

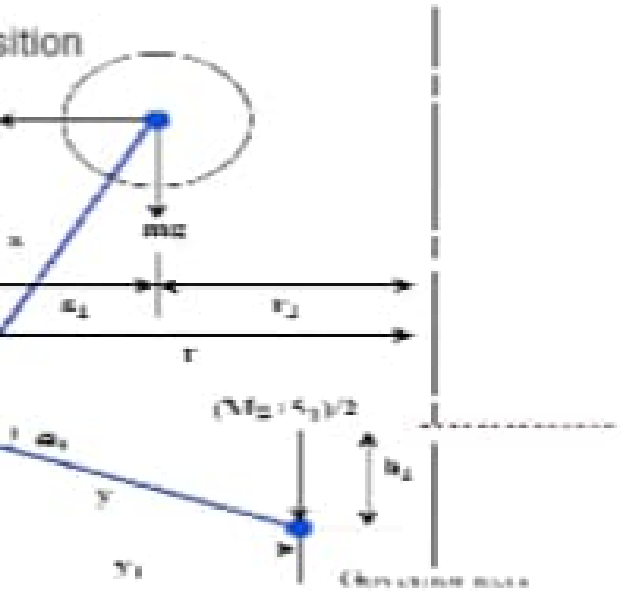
lift of sleeve :

nell Governor

Pop Up Procedure

Hartnell Governor

Free Body Diagram



N/mm): 27.89 CHECK

mm): 90.16 CHECK

CHECK

d/s ω_2 = 42rad/s

= 110mm

VARIABL

m (kg)

n (rpm)

CONTRO

Free Body Di

Minimum P

Maximum P

Exit Experime

Reset Experim

Copyright © SOLVE The Virtual Lab @ NITK Surathkal

Sharda University, Greater Noida - 201 306, Department of Mechanical Engineering

Internal Assessment -Attainment of Course Outcomes (Through Direct Assessment)

ACADEMIC YEAR - 2020 - 2021		BATCH	2018-19
COURSE CODE	MEP 320	TERM	5
COURSE TITLE	DYNAMICS OF MACHINES LAB	TARGET(%)	70
COURSE COORDINATOR	Dr.ANANDA BABU	SEC	A

ATTAINMENT LEVEL	Level	Range	
	1	Less than or equal to 50 % students scored 70 % marks	50
	2	More than 50 % and upto 60 % students scored more than 70 % marks	60
	3	Less than 60 % students scored more than 70 % marks	

S.NO	SYSTEM ID	REG NO	NAME OF THE STUDENT	WEEKLY EXPERIMENTAL EVALUATION						FINAL INTERNAL VIVA						CONTINUOUS ASSESSMENT						END SEMESTER EXAM						COURSE EXIT SURVEY					
				CO1	CO2	CO3	CO4	CO5	CO6	CO1	CO2	CO3	CO4	CO5	CO6	CO1	CO2	CO3	CO4	CO5	CO6	CO1	CO2	CO3	CO4	CO5	CO6	CO1	CO2	CO3	CO4	CO5	CO6
				6.67	6.67	6.67	6.67	6.67	6.67	3.33	3.33	3.33	3.33	3.33	3.33	10.00	10.00	10.00	10.00	10.00	10.00	6.67	6.67	6.67	6.67	6.67	6.67	3	3	3	3	3	3
1	2016008917	160106011	Bhallamudi Venkata Bhaskar Sai	2.7	2.7	2.7	2.7	2.7	2.7	1.5	1.5	1.5	1.5	1.5	1.5	4.2	4.2	4.2	4.2	4.2	4.2	2.83	2.83	2.83	2.83	2.83	2.83	4.0	4.0	2.0	2.0	2.0	2.0
2	2018016104	180101183	Mayank Kumar Singh	6.3	6.3	6.3	6.3	6.3	6.3	3.0	3.0	3.0	3.0	3.0	3.0	9.3	9.3	9.3	9.3	9.3	9.3	6.50	6.50	6.50	6.50	6.50	6.50	4.0	4.0	1.0	1.0	1.0	1.0
3	2018002357	180103015	Kapil Kumar Bhati	5.8	5.8	5.8	5.8	5.8	5.8	0.8	0.8	0.8	0.8	0.8	0.8	6.7	6.7	6.7	6.7	6.7	6.7	5.50	5.50	5.50	5.50	5.50	5.50	4.0	4.0	5.0	5.0	4.0	4.0
4	2018004374	180106002	Abhay Kumar	5.0	5.0	5.0	5.0	5.0	5.0	2.7	2.7	2.7	2.7	2.7	2.7	7.7	7.7	7.7	7.7	7.7	7.7	4.83	4.83	4.83	4.83	4.83	4.83	1.0	1.0	5.0	1.0	4.0	4.0
5	2018008194	180106005	Akshat Kumar Jha	5.3	5.3	5.3	5.3	5.3	5.3	2.0	2.0	2.0	2.0	2.0	2.0	7.3	7.3	7.3	7.3	7.3	7.3	4.50	4.50	4.50	4.50	4.50	4.50	4.0	4.0	4.0	4.0	4.0	4.0
6	2018013867	180106006	Aman Prakash	5.8	5.8	5.8	5.8	5.8	5.8	3.2	3.2	3.2	3.2	3.2	3.2	9.0	9.0	9.0	9.0	9.0	9.0	6.50	6.50	6.50	6.50	6.50	6.50	4.0	4.0	5.0	5.0	4.0	4.0
7	2018002254	180106007	Ankit Sharma	5.8	5.8	5.8	5.8	5.8	5.8	2.7	2.7	2.7	2.7	2.7	2.7	8.5	8.5	8.5	8.5	8.5	8.5	5.33	5.33	5.33	5.33	5.33	5.33	4.0	4.0	4.0	4.0	4.0	4.0
8	2018005654	180106008	Armaan Haque	5.7	5.7	5.7	5.7	5.7	5.7	2.7	2.7	2.7	2.7	2.7	2.7	8.3	8.3	8.3	8.3	8.3	8.3	5.33	5.33	5.33	5.33	5.33	5.33	4.0	4.0	5.0	5.0	4.0	4.0
9	2018010216	180106009	Avishek Kumar Thakur	4.0	4.0	4.0	4.0	4.0	4.0	2.8	2.8	2.8	2.8	2.8	2.8	6.8	6.8	6.8	6.8	6.8	6.8	4.00	4.00	4.00	4.00	4.00	4.00	4.0	4.0	4.0	4.0	4.0	4.0
10	2018015920	180106011	Binita Thapa Magar	4.8	4.8	4.8	4.8	4.8	4.8	2.7	2.7	2.7	2.7	2.7	2.7	7.5	7.5	7.5	7.5	7.5	7.5	6.33	6.33	6.33	6.33	6.33	6.33	4.0	4.0	5.0	5.0	4.0	4.0
11	2018004112	180106012	Dipanshu Shrimali	5.8	5.8	5.8	5.8	5.8	5.8	2.7	2.7	2.7	2.7	2.7	2.7	8.5	8.5	8.5	8.5	8.5	8.5	5.00	5.00	5.00	5.00	5.00	5.00	4.0	4.0	4.0	4.0	4.0	4.0
12	2018010012	180106013	Himanshu Choudhary	2.5	2.5	2.5	2.5	2.5	2.5	0.7	0.7	0.7	0.7	0.7	0.7	3.2	3.2	3.2	3.2	3.2	3.2	5.50	5.50	5.50	5.50	5.50	5.50	4.0	4.0	5.0	5.0	5.0	5.0
13	2018006822	180106014	Manish	5.2	5.2	5.2	5.2	5.2	5.2	3.0	3.0	3.0	3.0	3.0	3.0	8.2	8.2	8.2	8.2	8.2	8.2	6.17	6.17	6.17	6.17	6.17	6.17	4.0	4.0	4.0	4.0	5.0	5.0
14	2018005062	180106016	Mohan Yadav	5.7	5.7	5.7	5.7	5.7	5.7	2.8	2.8	2.8	2.8	2.8	2.8	8.5	8.5	8.5	8.5	8.5	8.5	5.17	5.17	5.17	5.17	5.17	5.17	4.0	4.0	5.0	5.0	5.0	5.0
15	2018013248	180106020	Sapan Sunwar	6.7	6.7	6.7	6.7	6.7	6.7	3.0	3.0	3.0	3.0	3.0	3.0	9.7	9.7	9.7	9.7	9.7	9.7	6.33	6.33	6.33	6.33	6.33	6.33	4.0	4.0	4.0	4.0	5.0	5.0
16	2018015973	180106021	Shishir Acharya	6.7	6.7	6.7	6.7	6.7	6.7	3.2	3.2	3.2	3.2	3.2	3.2	9.8	9.8	9.8	9.8	9.8	9.8	6.50	6.50	6.50	6.50	6.50	6.50	4.0	4.0	5.0	5.0	5.0	5.0
17	2018003848	180106023	Sishir Bashyal	5.7	5.7	5.7	5.7	5.7	5.7	0.8	0.8	0.8	0.8	0.8	0.8	6.5	6.5	6.5	6.5	6.5	6.5	6.50	6.50	6.50	6.50	6.50	6.50	5.0	1.0	4.0	4.0	4.0	4.0
18	2018016100	180106024	SUSHAN NEPAL	5.7	5.7	5.7	5.7	5.7	5.7	2.2	2.2	2.2	2.2	2.2	2.2	7.8	7.8	7.8	7.8	7.8	7.8	6.00	6.00	6.00	6.00	6.00	6.00	5.0	0.0	5.0	5.0	0.0	0.0
19	2018003155	180106026	Tenzin Lhaden	6.7	6.7	6.7	6.7	6.7	6.7	2.2	2.2	2.2	2.2	2.2	2.2	8.8	8.8	8.8	8.8	8.8	8.8	6.50	6.50	6.50	6.50	6.50	6.50	5.0	0.0	4.0	4.0	0.0	0.0
20	2018015534	180106027	Vansh Vashist	5.8	5.8	5.8	5.8	5.8	5.8	2.8	2.8	2.8	2.8	2.8	2.8	8.7	8.7	8.7	8.7	8.7	8.7	6.33	6.33	6.33	6.33	6.33	6.33	5.0	0.0	5.0	5.0	0.0	0.0
21	2018013397	180106028	Vineet Prajapati	6.7	6.7	6.7	6.7	6.7	6.7	2.2	2.2	2.2	2.2	2.2	2.2	8.8	8.8	8.8	8.8	8.8	8.8	6.33	6.33	6.33	6.33	6.33	6.33	5.0	2.0	2.0	2.0	2.0	2.0
22	2019007968	190106801	Aman Prakash	5.8	5.8	5.8	5.8	5.8	5.8	2.1	2.1	2.1	2.1	2.1	2.1	7.9	7.9	7.9	7.9	7.9	7.9	6.33	6.33	6.33	6.33	6.33	6.33	5.0	2.0	2.0	2.0	2.0	2.0
23	2019006342	190106802	Hamid Siddiqui	3.5	3.5	3.5	3.5	3.5	3.5	0.8	0.8	0.8	0.8	0.8	0.8	4.3	4.3	4.3	4.3	4.3	4.3	5.00	5.00	5.00	5.00	5.00	5.00	3.0	4.0	4.0	4.0	4.0	4.0
24	2019004331	190106803	Md Shahriar Rokon	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	5.3	5.3	5.3	5.3	5.3	5.3	4.67	4.67	4.67	4.67	4.67	4.67	3.0	4.0	5.0	5.0	4.0	4.0
25	2019005571	190106806	Piyush Kanojiya	1.3	1.3	1.3	1.3	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.3	1.3	1.3	1.3	1.3	0.00	0.00	0.00	0.00	0.00	0.00	3.0	4.0	4.0	4.0	4.0	4.0
26	2019007215	190106807	Pratik Manik Pawar	6.7	6.7	6.7	6.7	6.7	6.7	1.8	1.8	1.8	1.8	1.8	1.8	8.5	8.5	8.5	8.5	8.5	8.5	6.33	6.33	6.33	6.33	6.33	6.33	3.0	4.0	5.0	5.0	4.0	4.0
27	2019008340	190106808	Shivam Mishra	5.8	5.8	5.8	5.8	5.8	5.8	2.1	2.1	2.1	2.1	2.1	2.1	7.9	7.9	7.9	7.9	7.9	7.9	6.17	6.17	6.17	6.17	6.17	6.17	2.0	4.0	4.0	4.0	4.0	4.0
28	2019007682	190106809	Shoaib Ali	2.7	2.7	2.7	2.7	2.7	2.7	2.1	2.1	2.1	2.1	2.1	2.1	4.8	4.8	4.8	4.8	4.8	4.8	6.00	6.00	6.00	6.00	6.00	6.00	4.0	4.0	5.0	5.0	5.0	5.0

	28	28	28	28	28	28	27	27	27	27	27	27	28	25	28	28	25	25
CO's Target Value	7.0	7.0	7.0	7.0	7.0	7.0	4.7	4.7	4.7	4.7	4.7	4.7	3.5	3.5	3.5	3.5	3.5	3.5
No. of Students scored above CO's Target Value	19	19	19	19	19	19	24	24	24	24	24	24	22	21	24	23	21	21
Percentage of Students scored above Target	67.86	67.857	67.86	67.86	67.86	67.86	88.89	88.9	88.9	88.89	88.9	88.889	78.6	84	85.71	82.14	84	84
CO Attainment	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Course Outcomes	Assessment	CES	80% Assessment + 20% CES	CO statements	
CO1	3	3	3	MEP320.1	Analyze and design centrifugal governors
CO2	3	3	3	MEP320.2	Demonstrate the gyroscopic effects in ships, aero-planes and road vehicles
CO3	3	3	3	MEP320.3	Analyze balancing problems in rotating and reciprocating machinery.
CO4	3	3	3	MEP320.4	Demonstrate free and forced vibrations of single degree freedom systems.
CO5	3	3	3	MEP320.5	Evaluate frequency vibration of two rotor system.
CO6	3	3	3	MEP320.6	Interpret the dynamic characteristics of mechanical system

Mapping of Cos with Pos/PSOs

	Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3.00	3	3	3		3							2	1	1	
CO2	3.00	3	3	3		3							2	1	1	
CO3	3.00	3	3	3		3							2	1	1	
CO4	3.00	3	3	3		3							2	1	1	
CO5	3.00	3	3	3		3							2	1	1	
CO6	3.00	3	3	3		3							2	1	1	

PO attainment through the course

PO Attainment	3.00	3.00	3.00	3.00		3.00							2.00	1.00	1.00	
PO Attainment	3.00	3.00	3.00	3.00		3.00							2.00	1.00	1.00	
PO Attainment	3.00	3.00	3.00	3.00		3.00							2.00	1.00	1.00	
PO Attainment	3.00	3.00	3.00	3.00		3.00							2.00	1.00	1.00	
PO Attainment	3.00	3.00	3.00	3.00		3.00							2.00	1.00	1.00	
PO Attainment	3.00	3.00	3.00	3.00		3.00							2.00	1.00	1.00	
	3.00	**3.00**	**3.00**	**3.00**		**3.00**							**2.00**	**1.00**	**1.00**	