

The offset increases as the gain of proportional controller increases. \* **True**

(1 Point)

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18

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

(1 Point)

True  
 False

True

True

19

The most suitable instrument for measuring temperature of steam in the heat exchanger \*

(1 Point)

Mercury thermometer  
 Bimetallic thermometer  
 Thermistor

Scanned with CamScanner

8

Ethyl acetate reacts with sodium hydroxide in a reaction called saponification reaction, yields products ethyl alcohol and ..... : \*

(1 Point)

A. CH<sub>3</sub>COONa

B. CH<sub>3</sub>COOH

C. CH<sub>3</sub>COOC<sub>2</sub>H<sub>5</sub>

D. (CH<sub>3</sub>CO)<sub>2</sub>O

9

Which of the following controllers has maximum offset? \*  
(1 Point)

P-controller

Scanned with CamScanner

28

Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

True

False

29

Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction \*

(1 Point)

True

False

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Lab 4 Final X Polymer Records - Go X From Arrhenius law a j X The offset int

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16

The rate constant of a chemical reaction increases by increasing the \*  
(1 Point)

Pressure

Time

Concentration of reactants

Temperature

17

The following experimental setup in Hydraulic Analog experiment was for the \*  
(1 Point)

11 21

horizontal capillary system with the vertex of the

Scanned with CamScanner

Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction \*  
(1 Point)

True

False

- Error
- Repeatability
- Reproducibility

12

All types of thermocouples have the same color of wire \*  
(1 Point)

True

False

13

The Arrhenius law plot of  $\ln k$  vs  $1/T$  gives a straight line with large slope for large activation energy.

✓ TRUE

Scanned with CamScanner

35 V

Can not be found

5

In the law of intermediate metal any metal can be used without any condition \*

(1 Point)

True

False

opposite Niggle

6

The offset introduced by proportional controller with gain  $K_c$  in response of first order system can be reduced by \*

(1 Point)

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Working principle of mercury in glass thermometer is based on the \_\_\_\_\_ of mercury with increase in temperature \*  
(1 Point)

- Increase of pressure
- Increase of thermal conductivity
- Volumetric expansion
- All of the above

The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_

The most suitable instrument for measuring temperature of steam in the heat  
exchanger \*   
(1 Point)

Thermometer rigga

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9

Arrhenius equation represents graphically the variation between the rate of reaction and temperature. \*

(1 Point)

- Rate of reaction
- Frequency factor
- Rate constant
- Activation of energy



following figure is: \*

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Which of the following controllers has maximum offset?

(1 Point)

P-controller

PI-controller X

PD-controller X

PID-controller X

10



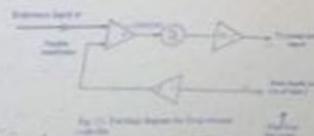
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- True
- False

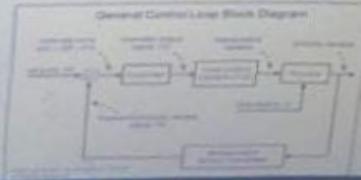
The offset introduced by proportional controller with gain  $K_c$  in response of first can be reduced by \*

**(1 Point)**

- Introducing integral control
- Reducing value of  $K_c$
- Introducing derivative control
- None of the above



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https://forms.office.com/Pages/ResponsePage.aspx?id=u11ABTw3IE6jDj5vz1B8\_sj314-Ti3dDuwhpo5c7b

3

From Arrhenius law, a plot of  $\log K$  versus  $1/T$  gives a straight line with a unit of  $E/R$  is \*

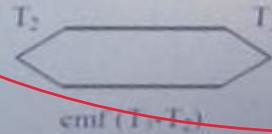
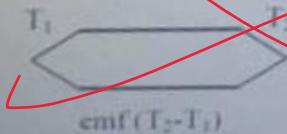
(1 Point)

- kcal
- kcal/K
- K
- kcal.K

4

For the following setting : the emf  $(T_3 - T_1) = 180$  V, and emf  $(T_2 - T_1) = 145$  V, the emf  $(T_3 - T_2)$  can be found to be: \*

(1 Point)



- 180 V
- 325 V
- 335 V



3.26

2.46

1.61

To generate empirical models, one of the step test procedure is carried out the process

open loop."

(1 point)

True

False

Empirical dynamic models are based on

data. "

(1 Point)

Physical phenomena of the process

Input/Output data

A+B

None of the above

Input/Output data

Scanned with CamScanner

25

In level control experiment, Pump coefficient =  $(\text{Vol.Flowrate}) / (\text{Applied vo})$  (1 Point)

 True False

26

Empirical dynamic models are based on ..... data. \* (1 Point)

 Physical phenomena of the process Input/output data A+B None of the above

27

The difference between the true (standard) value and the result of measurement is \*  
(2 Points)

Accuracy

Error

Repeatability

Reproducibility

TE

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

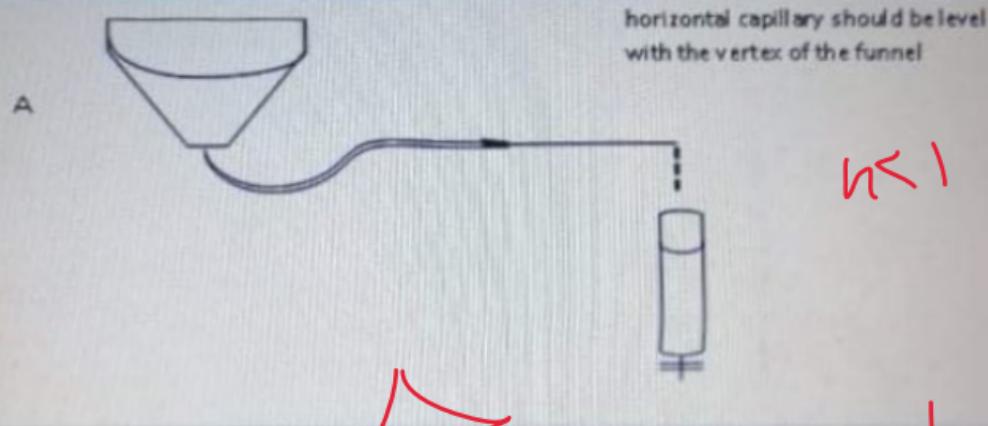
(1 Point)

True

Scanned with CamScanner

The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_

•  
(2 Points)

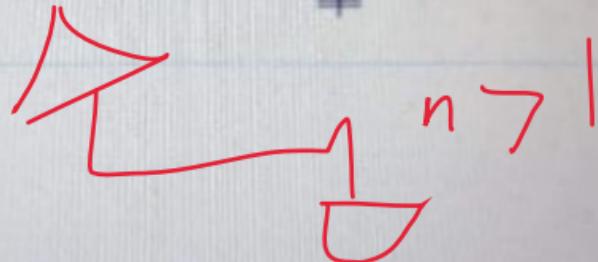


First order reversible reaction

First order series reaction

Reaction order  $n < 1$

Reaction order  $n > 1$



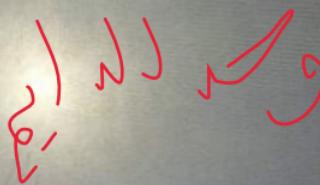
Scanned with CamScanner

2

To generate empirical models, one of the step test procedure is carried out the process with  
closed loop \*

(1 Point)

True  
 False



3

The offset increases as the gain of proportional controller increases \*

(1 Point)

False

18

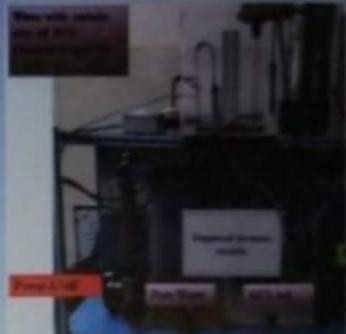
Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

True

False

Scanned with CamScanner



The following setting in Empiric models experiment was for: \*  
(1 Point)

- Impulse response
- Step up response
- Step down response
- Step up + step down response

In level control experiment, the final control element is \*   
(2 Points)

Level sensor

Pump

Comparator

Set point



The difference between the true (standard) value and the result of measurement is \*  
(2 Points)

- Accuracy
- Error
- Repeatability
- Reproducibility

The reaction between sodium hydroxide and ethyl acetate is first order.

Graphically, if we plot  $\ln(C_{A0}/C_A)$  v/s  $t$ , we will get a straight line through the origin indicating that the reaction is first order in sodium hydroxide.

$\ln(C_{A0}/C_A)$	0.699	1.114	1.211	1.350	1.60
$t$	1	5	7	10	15

For the first order reaction, we have

$$-\ln(C_A/C_{A0}) = k \cdot t$$

$$C_{A0} = 0.03 \text{ ( mol / lit )}$$

$$1] C_A = 0.0149 \text{ at } t = 1 \text{ min}$$

$$k = -\ln(0.0149 / 0.03) / 1$$

$$= 0.699 \text{ min}^{-1}$$

$$2] C_A = 0.00984 \text{ at } t=5 \text{ min}$$

$$k = -\ln(0.00984 / 0.03) / 5$$

$$= 0.222 \text{ min}^{-1}$$

$$3] C_A = 0.00892 \text{ at } t=7 \text{ min}$$

$$k = -\ln(0.00892 / 0.03) / 7$$

$$k = -\ln ( 0.00777 / 0.03 ) / 10$$

$$= 0.135 \text{ min}^{-1}$$

5]  $C_A = 0.00605$  at  $t = 15 \text{ min}$

$$k = -\ln ( 0.00605 / 0.03 ) / 15$$

$$= 0.106 \text{ min}^{-1}$$

6]  $C_A = 0.00493$  at  $t = 20 \text{ min}$

$$k = -\ln ( 0.00493 / 0.03 ) / 20$$

$$= 0.09 \text{ min}^{-1}$$

7]  $C_A = 0.00405$  at  $t = 25 \text{ min}$

$$k = -\ln ( 0.00405 / 0.03 ) / 25$$

$$= 0.08 \text{ min}^{-1}$$

The constancy of the rate mconstant k indicates that the the decomposition of sodium hydroxide is a first order reaction

Average value of rate constant , k

$$k = ( 0.6999 + 0.222 + 0.173 + 0.135 + 0.106 + 0.09 + 0.08 ) / 7$$

$$= 1.5059 / 7$$

$$= 0.215 \text{ min}^{-1}$$

Hence , rate constant of the reaction is  $0.215 \text{ min}^{-1}$



Likes: 0



Dislikes: 0

2]  $C_A = 0.00984$  at  $t=5$  min

$$k = -\ln (0.00984 / 0.03) / 5$$

$$= 0.222 \text{ min}^{-1}$$

3]  $C_A = 0.00892$  at  $t=7$  min

$$k = -\ln (0.00892 / 0.03) / 7$$

$$= 0.173 \text{ min}^{-1}$$

4]  $C_A = 0.00777$  at  $t=10$  min

$$k = -\ln (0.00777 / 0.03) / 10$$

$$= 0.135 \text{ min}^{-1}$$

5]  $C_A = 0.00605$  at  $t=15$  min

$$k = -\ln (0.00605 / 0.03) / 15$$

$$= 0.106 \text{ min}^{-1}$$

6]  $C_A = 0.00493$  at  $t=20$  min

$$k = -\ln (0.00493 / 0.03) / 20$$

$$= 0.09 \text{ min}^{-1}$$

7]  $C_A = 0.00405$  at  $t=25$  min

$$k = -\ln (0.00405 / 0.03) / 25$$

$$= 0.08 \text{ min}^{-1}$$

The constancy of the rate mconstant k indicates that the the decomposition of sodium hydroxide is a first order reaction

Average value of rate constant, k

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engineering questions and answers / 32 time (min) 1 5 7 ...



**Question: 32 Time (min) 1 5 7 10 15**

**20 25  $C_{A0} = 0,03$  mol/liter NaOH concentration (molliter) 0.0149...**

Time (min)	NaOH concentration (mol/liter)
1	0.0149
5	0.00984
7	0.00932
10	0.00777
15	0.00605
20	0.00493
25	0.00405

$C_A0 = 0,03$  mol/liter

32

The reaction between sodium hydroxide (A) and ethyl acetate (B) was carried out in a batch reactor at 25°C and these results were obtained  
Find the rate constant of the reaction

[Show transcribed image text](#)



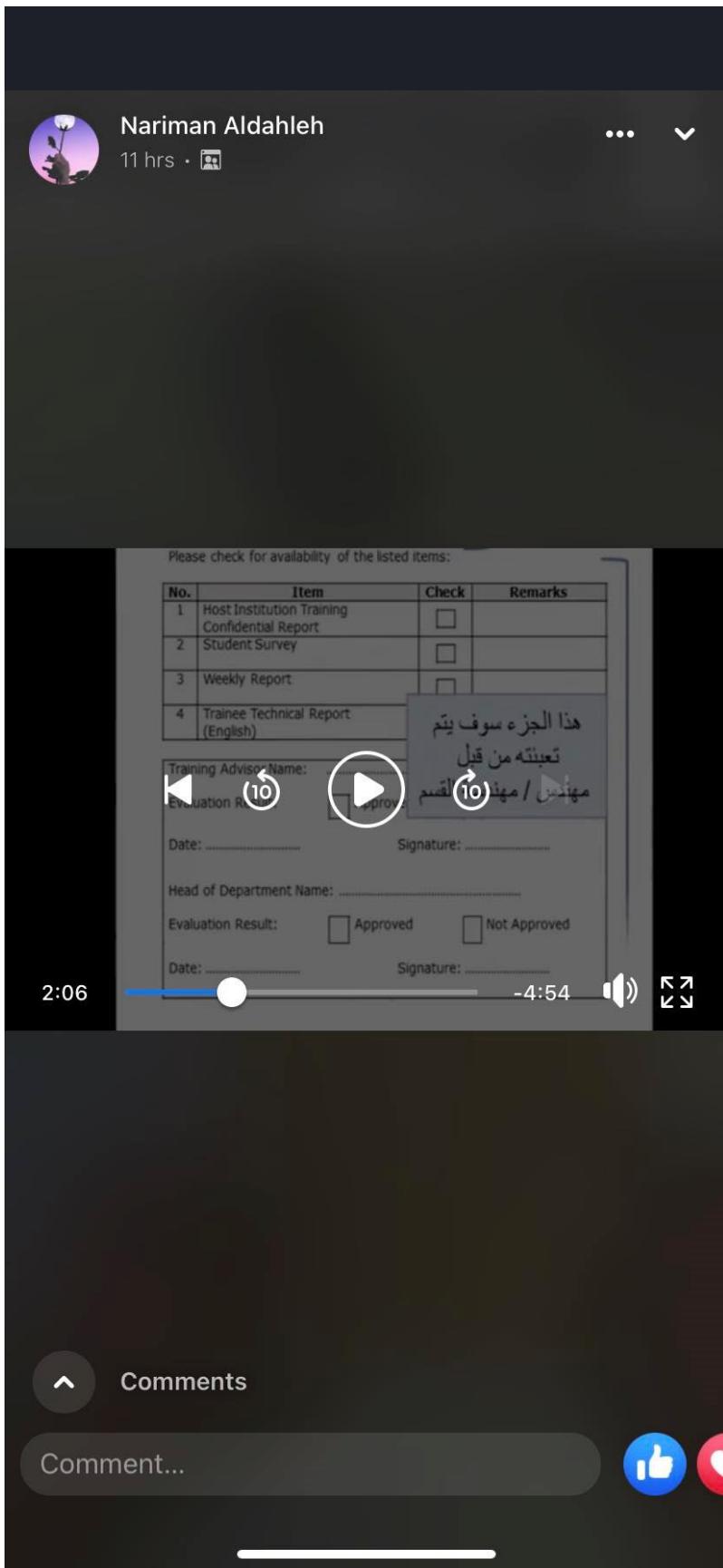
Here's the best way to solve it.

### This problem has been solved!

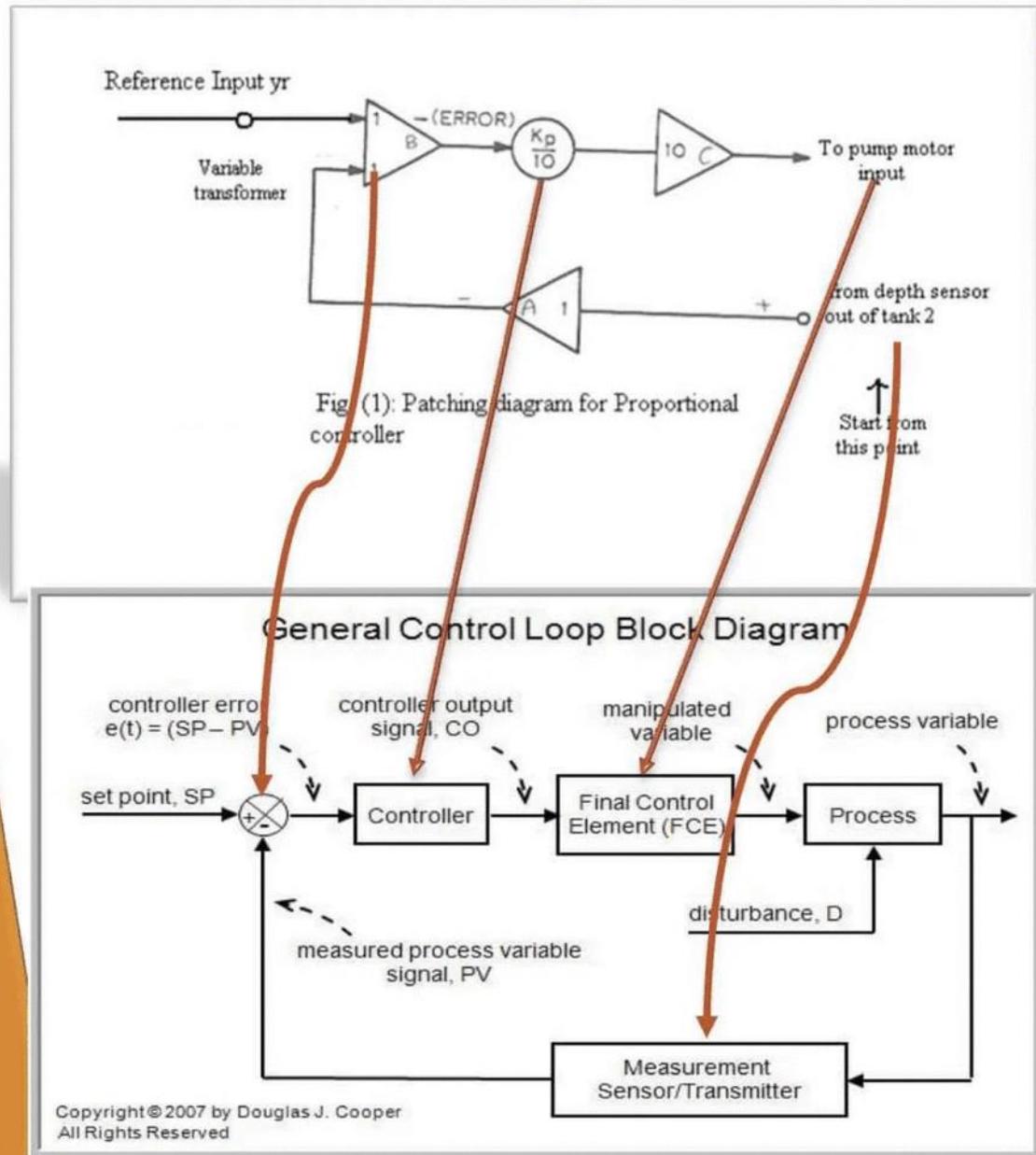
You'll get a detailed solution from a subject matter expert that helps you learn core concepts.



[See Answer](#)



# a. Steady State Error



13



The following setting in Empirical dynamic models experiment was for: \*

(1 Point)

- Impulse response
- Step up response
- Step down response
- Step up + step down response

5

35 V

Can not be found

In the law of intermediate metal any metal can be used without any condition \*

(1 Point)

- True
- False

6

The offset introduced by proportional controller with gain  $K_c$  in response of first order system can be reduced by \*

(1 Point)

- Reducing value of  $K_c$
- Introducing integral control

True

False

28

Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

True

False

29

Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction \*

(1 Point)

True

False

23

Parallel connection of thermocouples gives the average reading of temperatures of thermocouples used \*

(1 Point)

True

False

24

The Full Experiment was \*

(1 Point)

Level Control

CSTR Reactor

Batch Reactor

Hydraulic Analogue

25

True Experiment. Pump coefficient = (Vol.Flowrate )/Applied voltage ) \*

6

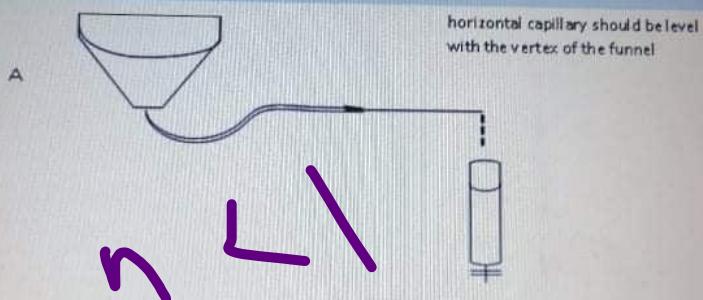
Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature.\*  
(1 Point)

True

False

7

The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_  
(2 Points)

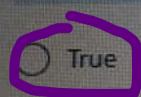


- First order reversible reaction
- First order series reaction
- Reaction order  $n < 1$
- Reaction order  $n > 1$

2

To generate empirical models, one of the step test procedure is carried out the process with closed loop \*

(1 Point)



3

The offset increases as the gain of proportional controller increases \*

(1 Point)

11

The calibration data of a thermocouple are given below. The hot junction of the thermocouple is placed in a bath at 80°C, while its cold junction is at 20°C. What is the (mv) of thermocouple?

\*

(2 Points)

Hot junction temperature (°C)	0	20	40	60	80	100
Thermo emf (mv)	0.0	0.80	1.61	2.43	3.26	4.10

4.06

3.26

2.46

1.61

22

The most suitable instrument for measuring temperature of steam in the heat exchanger \* 

(1 Point)

- Mercury thermometer
- Bimetallic thermometer
- Thermistor
- None of the above

22

Ans  
Ex

25

In level control experiment, Pump coefficient = (Vol.Flowrate )/Applied volt  
(1 Point)

True

False

26

Empirical dynamic models are based on ..... data. \*(1 Point)

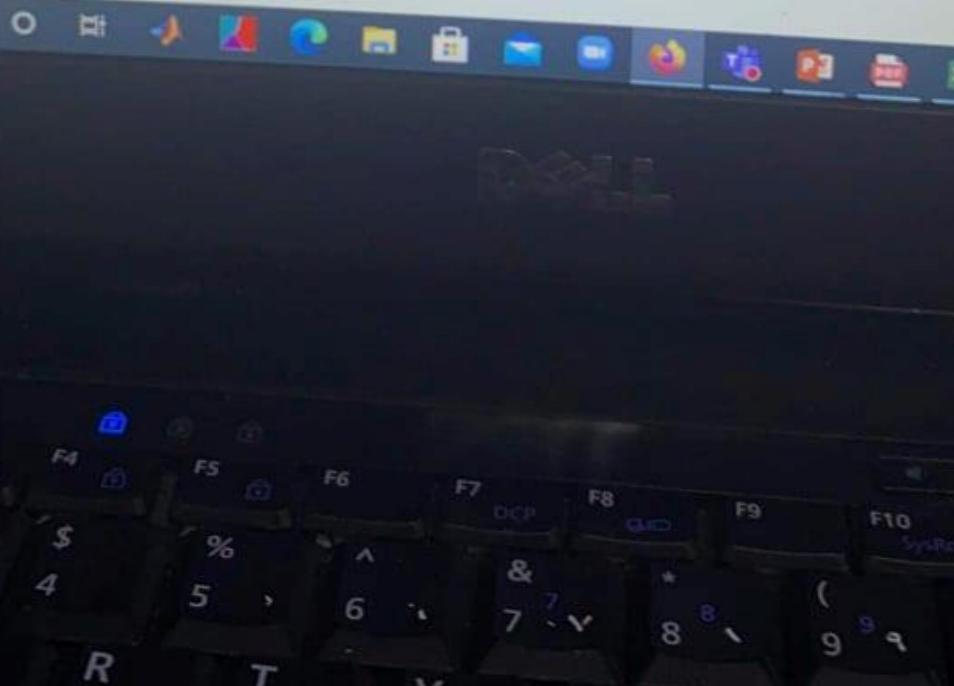
Physical phenomena of the process

Input/output data

A+B

None of the above

27



- A+B
- None of the above

25

The Full Experiment was " \*  
(2 Points)

- Level Control
- CSTR Reactor
- Batch Reactor
- Hydraulic Analogue

26



Y4 Final

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3.26

2.46

1.61

5

To generate empirical models, one of the step test procedure is carried out the process with open loop. \*

(1 Point)

True

False

6

Empirical dynamic models are based on \_\_\_\_\_ data, \*

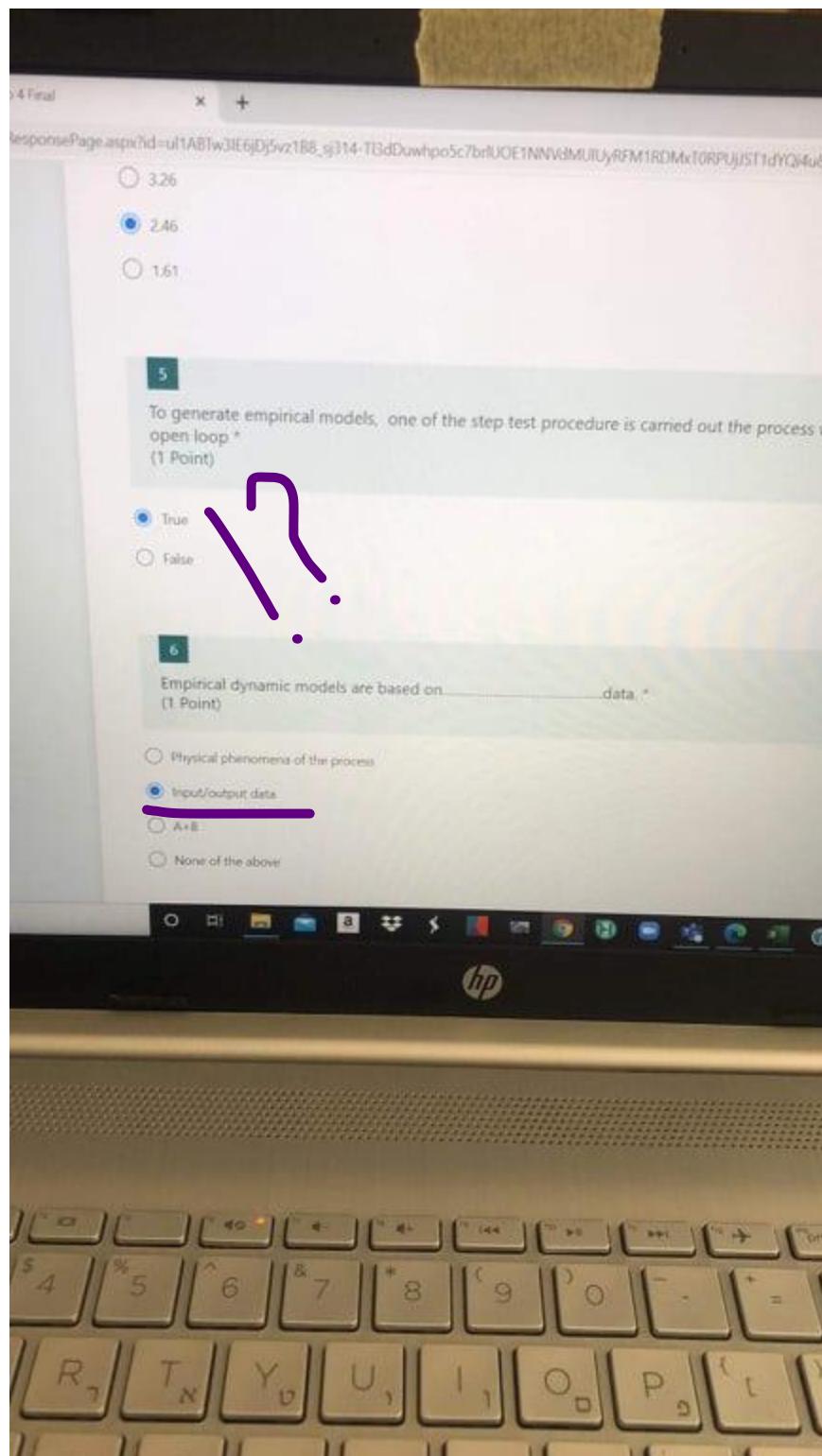
(1 Point)

Physical phenomena of the process

Input/output data

A+B

None of the above



11

The Arrhenius law plot of  $\ln k$  vs  $1/T$  gives a straight line with large slope for large activation energy.

(1 Point)

True

False

True

False

6

The offset introduced by proportional controller with gain  $K_c$  in response of first order system can be reduced by \*

(1 Point)

Reducing value of  $K_c$ .

Introducing integral control

Introducing derivative control

None of the above

7

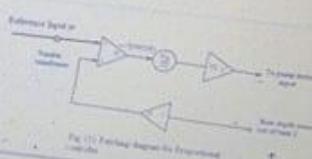
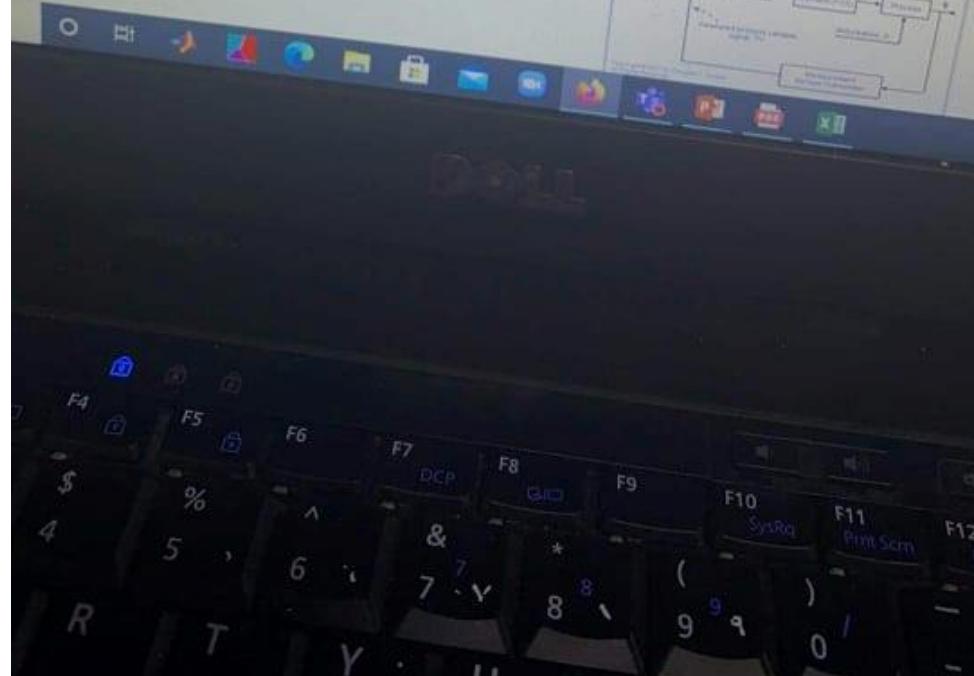


Fig. 11.7 Feedback diagram for Proportional controller

General Control Loop Block Diagram



Lab 4 Final X Polymer Records - Go X From Arrhenius law a p X The offset intro

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16

The rate constant of a chemical reaction increases by increasing the (1 Point)

Pressure

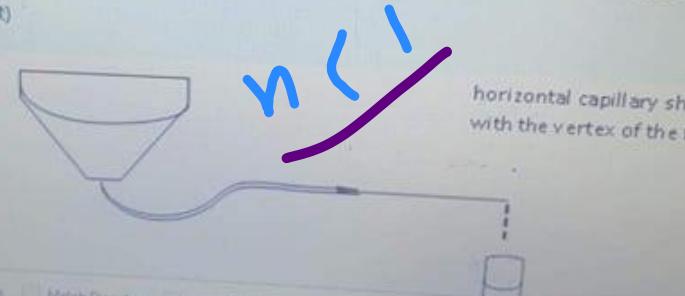
Time

Concentration of reactants

Temperature

17

The following experimental setup in Hydraulic Analog experiment was for the (1 Point)

A 

horizontal capillary sh with the vertex of the f

Highlight All Match Case Match Dynamics Whole Words

Windows Taskbar: F2, F3, F4, F5, F6, F7 DCP, F8 GUO, F9, F10 Systol, @, #, \$, %, ^, &, \*, (, ), 3, 4, 5, 6, 7, 8, 9, W, E, R, T, Y, U, I, O

6

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

(1 Point)

True

False

11

The calibration data of a thermocouple are given below. The hot junction of the thermocouple is placed in a bath at 80°C, while its cold junction is at 20°C. What is the (mv) of thermocouple? \*

(2 Points)

<b><i>Hot junction temperature (°C)</i></b>	<b>0</b>	<b>20</b>	<b>40</b>	<b>60</b>	<b>80</b>	<b>100</b>
<b><i>Thermo emf (mv)</i></b>	0.00	0.80	1.61	2.43	3.26	4.10

4.06

3.26

2.46

1.61

12

The rate constant of a chemical reaction increases by increasing the \*

(2 Points)

11

The calibration data of a thermocouple are given below. The hot junction of the thermocouple is placed in a bath at 80°C, while its cold junction is at 20°C. What is the (mv) of thermocouple? \*

(2 Points)

Hot junction temperature (°C)	0	20	40	60	80	100
Thermo emf (mv)	0.00	0.80	1.61	2.43	3.26	4.10

4.06

3.26

2.46

1.61

Error

~~Repeatability~~

Reproducibility

12

All types of thermocouples have the same color of wire \*

(1 Point)

True

False

13

The Arrhenius law plot of  $\ln k$  vs  $1/T$  gives a straight line with large slope for large activation energy.

Acti  
n

100°F Sunny

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3

From Arrhenius law, a plot of  $\log K$  versus  $1/T$  gives a straight line with unit of  $E/R$  is \*

(1 Point)

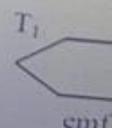
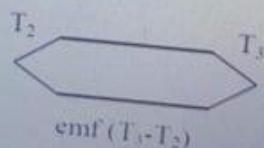
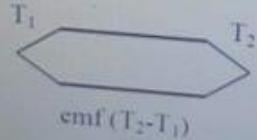
- kcal
- kcal/K
- K
- kcal.K

$$\frac{E}{R} = \frac{1}{\sqrt{m \cdot \sigma}} = K$$

4

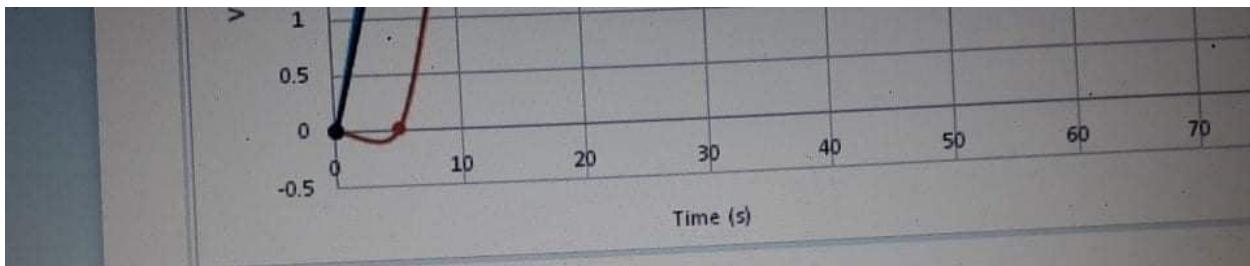
For the following setting : the emf  $(T_3 - T_1) = 180$  V, and emf  $(T_2 - T_1) = 145$  V , the can be found to be: \*

(1 Point)



- 180 V
- 325 V
- 35 V





- Black  $k_p=10$  , Orange  $k_p=5$  , Blue  $k_p =3$
- Black  $k_p=3$  , Orange  $k_p=5$  , Blue  $k_p =10$
- Black  $k_p=5$  , Orange  $k_p=3$  , Blue  $k_p =10$
- Black  $k_p=5$  , Orange  $k_p=10$  , Blue  $k_p =3$

False

13

Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction \*

(1 Point)

True

False

14

False

18

Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

True

False

7

The difference between the true (standard) value and the result of measurement is \*  
(2 Points)

Accuracy

Error

Repeatability

Reproducibility

lab-4 Final lab-4 manual sheet

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6

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*(1 Point)

True  
 False

7

The difference between the true (standard) value and the result of measurement is \*  
(2 Points)

Accuracy  
 Error  
 Repeatability  
 Reproducibility

8

16

The offset introduced by proportional controller with gain  $K_c$  in response to a step change in the input signal can be reduced by \*  
(1 Point)

Reducing value of  $K_c$   
 Introducing integral control  
 Introducing derivative control  
 None of the above

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

When comparing the Patching diagram for Proportional controller with General control loop block diagram, the correct match is: \*

(1 Point)

- B with controller, K<sub>p</sub> with final control element
- A with comparator, K<sub>p</sub> with controller
- B with comparator, K<sub>p</sub> with controller
- C with comparator, K<sub>p</sub> with controller

None of the above

9

Arrhenius equation represents graphically the variation between the \_\_\_\_\_ and temperature. \*

(1 Point)

- Rate of reaction
- Frequency factor
- Rate constant
- Activation of energy

6

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

(1 Point)

- True
- False

26

The image contains two diagrams. The top diagram, labeled 'Fig. (1) Patching diagram for Proportional controller', shows a feedback control loop. It starts with a 'Reference Signal' input, followed by a summing junction with a gain block (G). The output of this junction is fed into a 'Proportional controller' (represented by a triangle). The output of the controller is then fed into a 'Final Control Element (FCE)' (represented by a triangle). The output of the FCE is the 'Controlled Variable'. A feedback line from the 'Controlled Variable' goes through a 'Measurement Sensor/Transmitter' and a 'Process' block to a 'Summing junction' with a gain block (Kp). The output of this junction is the 'Error signal'. The error signal is fed into the 'Proportional controller'. The bottom diagram, labeled 'General Control Loop Block Diagram', shows a more abstract block diagram of a control system. It includes a 'Controller' block, a 'Final Control Element (FCE)', a 'Process', and a 'Measurement Sensor/Transmitter'. The 'Controller' receives a 'Controller input' (Error signal) and a 'Set point, SP'. It outputs a 'Controlled variable signal, CD'. The 'Controlled variable signal, CD' is fed into the 'Final Control Element (FCE)'. The 'Final Control Element (FCE)' outputs to the 'Process'. The 'Process' outputs to the 'Measurement Sensor/Transmitter'. The 'Measurement Sensor/Transmitter' outputs to the 'Controller' and to a 'Summing junction' with a gain block (Kp). The 'Summing junction' also receives the 'Set point, SP' and the 'Controlled variable signal, CD'. The output of the 'Summing junction' is the 'Controller input'.

When comparing the Patching diagram for Proportional controller with General control loop block diagram, the correct match is:

(1 Point)

- B with controller, Kp with final control element
- A with comparator, Kp with controller
- B with comparator, Kp with controller
- C with comparator, Kp with controller

جامعة عجمان X Lab 4 Final X Polymer Records - Google Drive X Arrhenius equation represents  
[/forms.office.com/Pages/ResponsePage.aspx?id=ul1ABTw3IE6jDj5vz188\\_sj314-Ti3dDuwhpo5c7briUOE1NNVdMUIUyRFM](https://forms.office.com/Pages/ResponsePage.aspx?id=ul1ABTw3IE6jDj5vz188_sj314-Ti3dDuwhpo5c7briUOE1NNVdMUIUyRFM)

2

The calibration data of a thermocouple are given below. The hot junction of the thermocouple is placed in a bath at 80°C, while its cold junction is at 20°C. What is the (mv) of thermocouple?

(1 Point)

Hot junction temperature (°C)	0	20	40	60	80	100
Thermo emf (mv)	0.00	0.80	1.61	2.43	3.26	4.10

4.06  
 3.26  
 2.46  
 1.61

3

From Arrhenius law, a plot of  $\log e$  versus  $1/T$  gives a straight line with a slope of  $(-E/R)$ . The unit of  $E/R$  is \*

(1 Point)

kcal  
 kcal/k

21

In level control experiment, the final control element is \*

Level sensor

Pump

Comparator

Set point



22

18

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

(1 Point)

True

False

19

The most suitable instrument for measuring temperature of steam in the heat exchanger \*

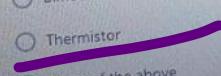
(1 Point)

Mercury thermometer

Bimetallic thermometer

Thermistor

None of the above



23

The offset increases as the gain of proportional controller increases. \*

(1 Point)

True

False

24

Empirical dynamic models are based on.....data. \*

8

Ethyl acetate reacts with sodium hydroxide in a reaction called saponification reaction, yields products ethyl alcohol and ..... : \*

(1 Point)

A. CH<sub>3</sub>COONa

B. CH<sub>3</sub>COOH

C. CH<sub>3</sub>COOC<sub>2</sub>HS

D. (CH<sub>3</sub>CO)<sub>2</sub>O

9

Which of the following controllers has maximum offset? \*

(1 Point)

P-controller

Activate Windows  
Go to Settings > About

100°F Sunny

Google credit Balqa Applied Univ... Telegram Web Online Python Com... red hat ccna 200-301

True  
 False

18

Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

True  
 False

19

From Arrhenius law, a plot of  $\log K$  versus  $1/T$  gives a straight line with a slope of  $(-E/R)$ . The unit of  $E/R$  is \*

2

To generate empirical models, one of the step test procedure is carried out the process with closed loop \*

(1 Point)

True

False

1/2  
..

3

The offset increases as the gain of proportional controller increases \*

(1 Point)

X

Microsoft Edge Microsoft Office Home My tasks message Lab 4 Final lab4 - manual sheet

Office.com/Pages/ResponsePage.aspx?d=u1A8Tw3IE6gDj5vz1B8\_xj314-T13dDuwhpo5c7brfUOE1NNWdMUIUy8JM1RDMxT0RPUjS11dYQj4o8tfbdidnhwA82pn55

Maps Translate Google credt Balqa Applied Univ... Telegram Web Online Python Com... red hat ccna 200-301

13



The following setting in Empirical Dynamic Models experiment was for: \*

(1 Point)

- Impulse response
- Step up response
- Step down response
- Step up + step down response

10

The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_

(2 Points)

A

horizontal capillary should be level with the vertex of the funnel

- First order reversible reaction
- First order series reaction
- Reaction order  $n < 1$
- Reaction order  $n > 1$

25

The Full Experiment was " \*

(2 Points)

- Level Control
- CSTR Reactor
- Batch Reactor
- Hydraulic Analogue

21

In temperature measurement experiment ,when take the reading of the voltage for the series connection , the voltage value must be divided by \_\_\_\_\_ to have the temperature reading: \*

40  
 1  
 2  
 4

22

Working principle of mercury in glass thermometer is based on the \_\_\_\_\_ of mercury with increase in temperature \*

(1 Point)

Increase of pressure  
 Increase of thermal conductivity  
 Volumetric expansion  
 A+B  
 None of the above

25

The Full Experiment was " \*  
(2 Points)

Level Control  
 CSTR Reactor  
 Batch Reactor  
 Hydraulic Analogue

26



29 In temperature measurement experiment ,when take the reading of the voltage for the series connection , the voltage value must be divided by \_\_\_\_\_ to have the temperature reading. \*

(1 Point)

40

1

2

4

20

Working principle of mercury in glass thermometer is based on the \_\_\_\_\_ of mercury with increase in temperature \*

(1 Point)

Increase of pressure

Increase of thermal conductivity

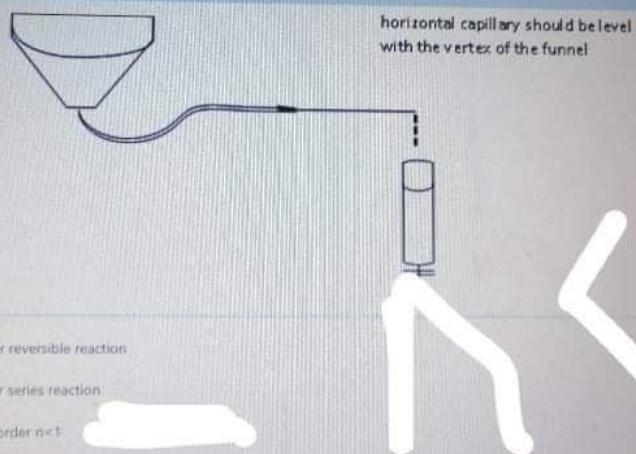
Volumetric expansion

All of the above

21

The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_

28 The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_  
\* (2 Points)

A   
horizontal capillary should be level with the vertex of the funnel

- First order reversible reaction.
- First order series reaction.
- Reaction order  $n < 1$ .
- Reaction order  $n > 1$ .

28 Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \* (1 Point)

- True
- False

29 Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction. \* (1 Point)

- True
- False

21

In level control experiment, the final control element is \*

Level sensor

Pump

Comparator

Set point



22

The difference between the true (standard) value and the result of measurement is \*  
(2 Points)

Accuracy



Error

Repeatability

Reproducibility

13



The following setting in Empirical dynamic models experiment was for: \*

(1 Point)

- Impulse response
- Step up response
- Step down response
- Step up + step down response

9

Which of the following controllers has maximum offset? \*

(1 Point)

- P-controller
- PI-controller
- PD-controller
- PID-controller

10



Hydraulic Analogue

9

Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction \*  
(1 Point)

True

False

10

7

The difference between the true (standard) value and the result of measurement is \*  
(2 Points)

Accuracy

Error

Repeatability

Reproducibility

7

The difference between the true (standard) value and the result of measurement is \*  
(2 Points)

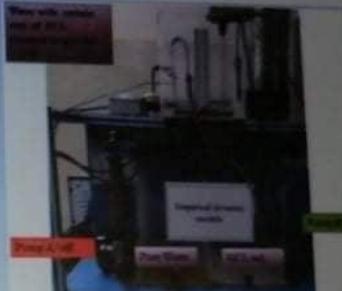
Accuracy

Error

Repeatability

Reproducibility

13



The following setting in Empirical dynamic models experiment was for: \*

(1 Point)

- Impulse response
- Step up response
- Step down response
- Step up + step down response

9

Which of the following controllers has maximum offset? \*

(1 Point)

- P-controller
- PI-controller
- PD-controller
- PID-controller

10



Hydraulic Analogue

9

Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction \*

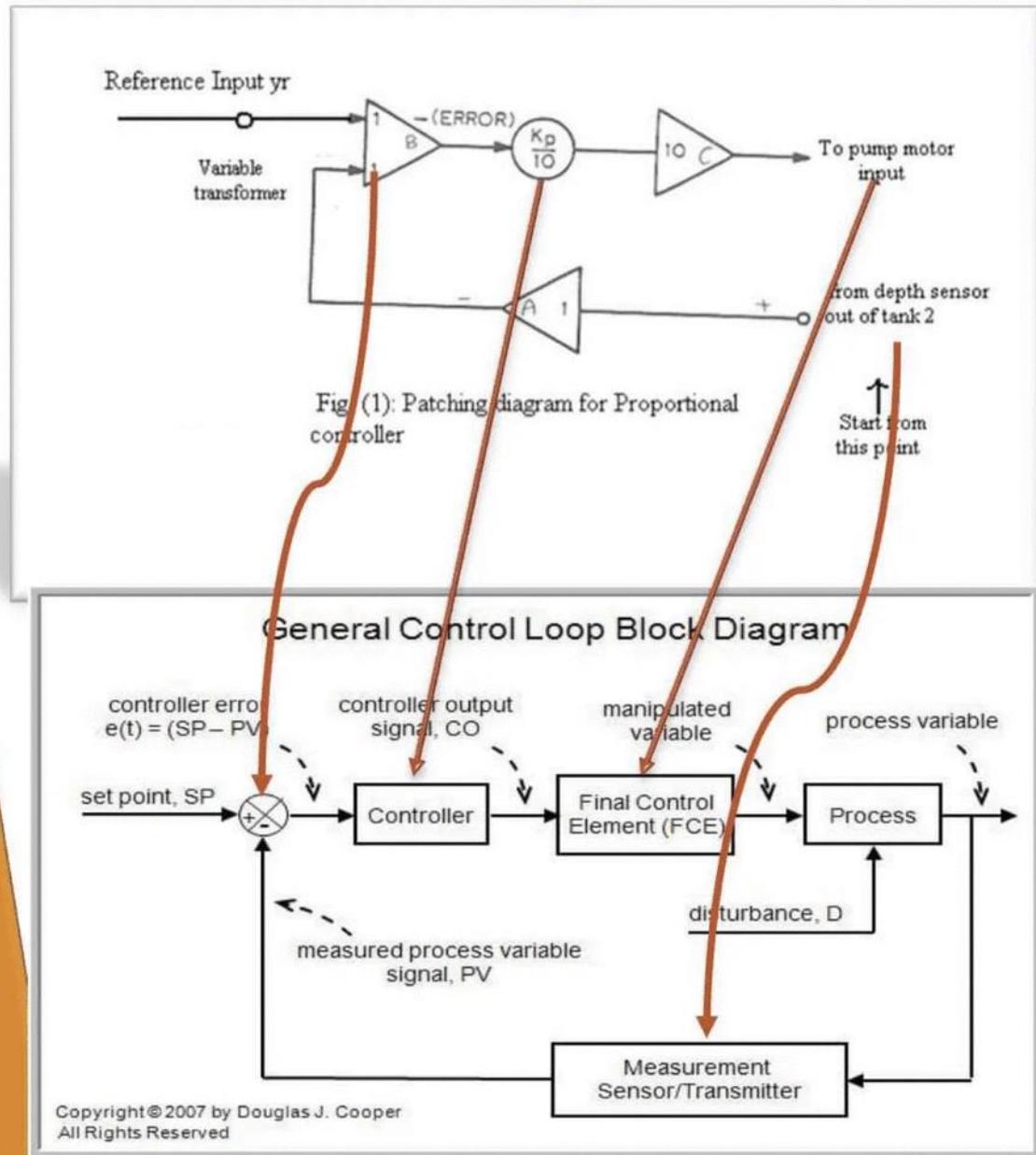
(1 Point)

True

False

10

# a. Steady State Error



13



The following setting in Empirical dynamic models experiment was for: \*

(1 Point)

- Impulse response
- Step up response
- Step down response
- Step up + step down response

5

In the law of intermediate metal any metal can be used without any condition \*

(1 Point)

- True
- False

6

The offset introduced by proportional controller with gain  $K_c$  in response of first order system can be reduced by \*

(1 Point)

- Reducing value of  $K_c$
- Introducing integral control

True

False

28

Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

True

False

29

Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction \*

(1 Point)

True

False

23

Parallel connection of thermocouples gives the average reading of temperatures of thermocouples used \*

(1 Point)

True

False

24

The Full Experiment was \*

(1 Point)

Level Control

CSTR Reactor

Batch Reactor

Hydraulic Analogue

25

For a pump experiment, Pump coefficient = (Vol.Flowrate )/Applied voltage ) \*

6

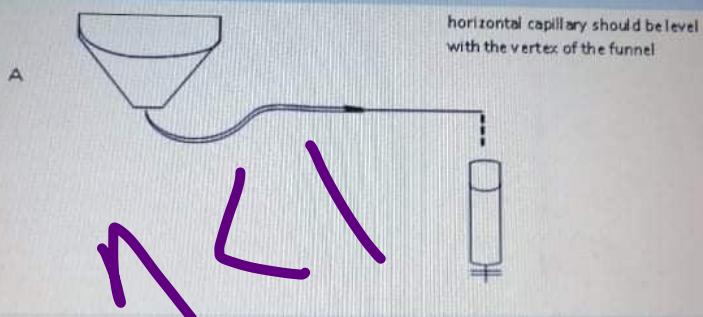
Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature.\*  
(1 Point)

True

False

7

The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_  
(2 Points)



First order reversible reaction

First order series reaction

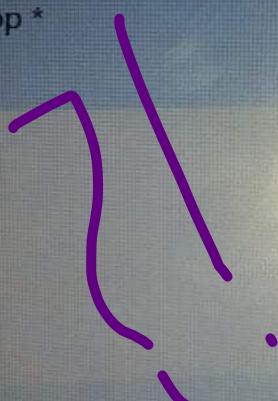
Reaction order  $n < 1$

Reaction order  $n > 1$

2

To generate empirical models, one of the step test procedure is carried out the process with closed loop \*  
(1 Point)

True  
 False



3

The offset increases as the gain of proportional controller increases \*  
(1 Point)

11

The calibration data of a thermocouple are given below. The hot junction of the thermocouple is placed in a bath at 80°C, while its cold junction is at 20°C. What is the (mv) of thermocouple?

\*   
(2 Points)

Hot junction temperature (°C)	0	20	40	60	80	100
Thermo emf (mv)	0.0	0.80	1.61	2.43	3.26	4.10

4.06  
 3.26  
 2.46  
 1.61

22

The most suitable instrument for measuring temperature of steam in the heat exchanger \* 

(1 Point)

- Mercury thermometer
- Bimetalic thermometer
- Thermistor
- None of the above

22

Ans  
Ex

25

In level control experiment, Pump coefficient = (Vol.Flowrate )/Applied volt  
(1 Point)

True

False

26

Empirical dynamic models are based on ..... data. \*(1 Point)

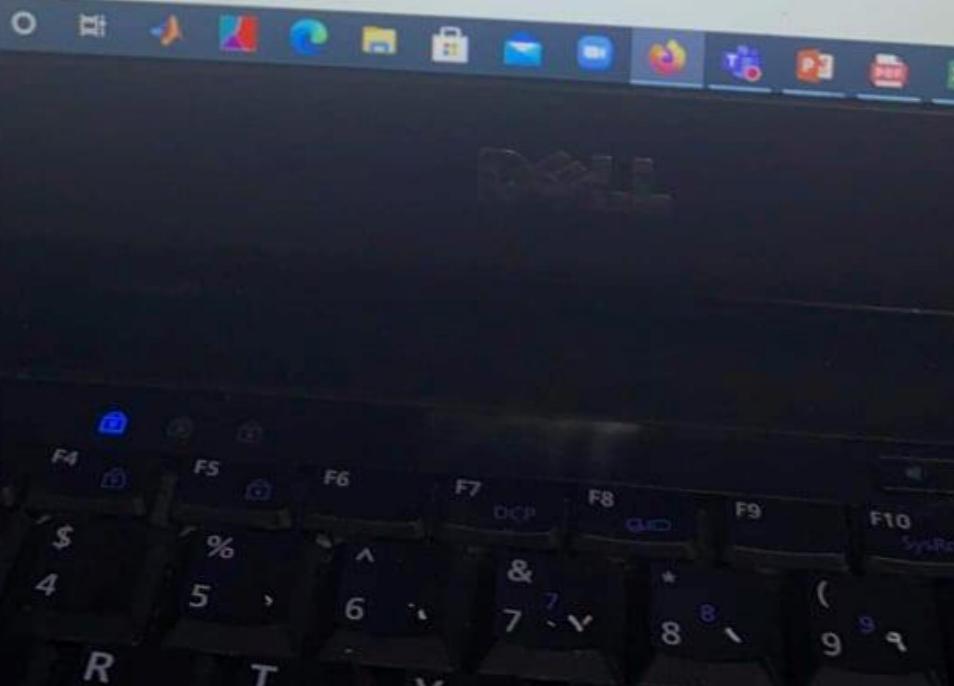
Physical phenomena of the process

Input/output data

A+B

None of the above

27



- A+B
- None of the above

25

The Full Experiment was " \*  
(2 Points)

- Level Control
- CSTR Reactor
- Batch Reactor
- Hydraulic Analogue

26



Y4 Final

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5

To generate empirical models, one of the step test procedure is carried out the process with open loop \*

(1 Point)

True

False

6

Empirical dynamic models are based on \_\_\_\_\_ data, \*

(1 Point)

Physical phenomena of the process

Input/output data

A+B

None of the above

?

Y4 Final

responsePage.aspx?id=ul1AB1w3IE6j5vz188\_sj314-T13dDuwhpo5c7brlUOE1NNW9MUIUyRFM1R0MxT0RPUJUST1dYQ34u8

3.26

2.46

1.61

5

To generate empirical models, one of the step test procedure is carried out the process with open loop. \*

(1 Point)

True

False

6

Empirical dynamic models are based on \_\_\_\_\_ data. \*

(1 Point)

Physical phenomena of the process

Input/output data

A+B

None of the above

11

The Arrhenius law plot of  $\ln k$  vs  $1/T$  gives a straight line with large slope for large activation energy.

(1 Point)

True

False

True

False

6

The offset introduced by proportional controller with gain  $K_c$  in response of first order system can be reduced by \*

(1 Point)

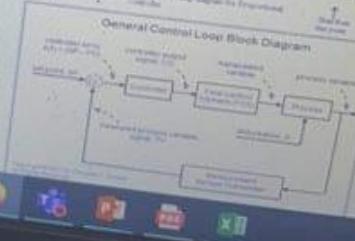
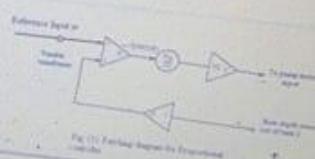
Reducing value of  $K_c$

Introducing integral control

Introducing derivative control

None of the above

7



Lab 4 Final X Polymer Records - Go X From Arrhenius law a p X The offset intro

[https://forms.office.com/Pages/ResponsePage.aspx?id=ul1ABTw3IE6jDj5vz1B8\\_sj314-Tl3dDuwhpo5c7brlUC](https://forms.office.com/Pages/ResponsePage.aspx?id=ul1ABTw3IE6jDj5vz1B8_sj314-Tl3dDuwhpo5c7brlUC)

16

The rate constant of a chemical reaction increases by increasing the  Temperature

Pressure

Time

Concentration of reactants

17

The following experimental setup in Hydraulic Analogy experiment was for the  horizontal capillary shear with the vertex of the funnel

(1 Point)

A

horizontal capillary shear with the vertex of the funnel

Highlighter Match Case Match Dynamics Adaptive Words

F2 F3 F4 F5 F6 F7 DCP F8 F9 F10

W E R T Y U

3 4 5 , 6 7 8 9

6

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

(1 Point)

True

False

11

The calibration data of a thermocouple are given below. The hot junction of the thermocouple is placed in a bath at 80°C, while its cold junction is at 20°C. What is the (mv) of thermocouple? \*

(2 Points)

<b><i>Hot junction temperature (°C)</i></b>	<b>0</b>	<b>20</b>	<b>40</b>	<b>60</b>	<b>80</b>	<b>100</b>
<b><i>Thermo emf (mv)</i></b>	0.00	0.80	1.61	2.43	3.26	4.10

4.06

3.26

2.46

1.61

12

The rate constant of a chemical reaction increases by increasing the \*

(2 Points)

11

The calibration data of a thermocouple are given below. The hot junction of the thermocouple is placed in a bath at 80°C, while its cold junction is at 20°C. What is the (mv) of thermocouple? \*

(2 Points)

Hot junction temperature (°C)	0	20	40	60	80	100
Thermo emf (mv)	0.00	0.80	1.61	2.43	3.26	4.10

4.06

3.26

2.46

1.61

Error

Repeatability

Reproducibility

12

All types of thermocouples have the same color of wire \*

(1 Point)

True

False

13

The Arrhenius law plot of  $\ln k$  vs  $1/T$  gives a straight line with large slope for large activation energy.



100°F Sunny

فيسبوك - تسجيل اخبار Lab 4 Final X Polymer Records - Google Drive X From https://forms.office.com/Pages/ResponsePage.aspx?id=ul1ABTw3IE6jDj5vz1B8\_sj314-Tl3dDuwhpo5c7br/ 3

From Arhenius law, a plot of  $\log K$  versus  $1/T$  gives a straight line with a unit of  $E/R$  is \*

(1 Point)

kcal

kcal/K

K

kcal.K

4

For the following setting : the emf  $(T_3 - T_1) = 180$  V, and emf  $(T_2 - T_1) = 145$  V , the emf can be found to be: \*

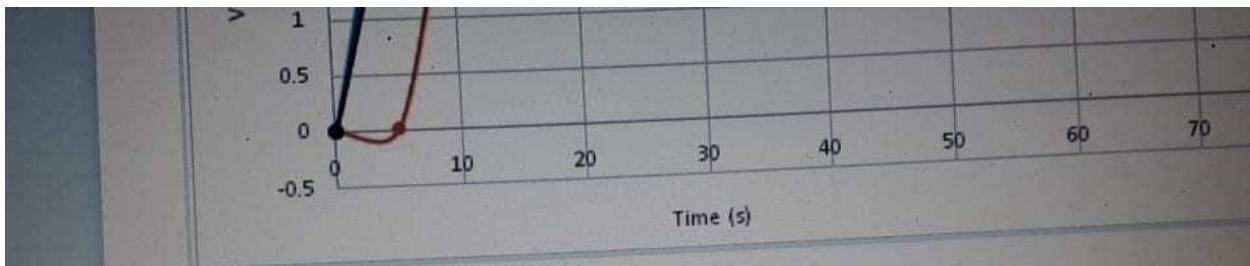
(1 Point)

180 V

325 V

35 V

Dell



- Black  $k_p=10$  , Orange  $k_p=5$  , Blue  $k_p =3$
- Black  $k_p=3$  , Orange  $k_p=5$  , Blue  $k_p =10$
- Black  $k_p=5$  , Orange  $k_p=3$  , Blue  $k_p =10$
- Black  $k_p=5$  , Orange  $k_p=10$  , Blue  $k_p =3$

False

13

Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction \*

(1 Point)

- True
- False

14

False

18

Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

True

False

False

18

Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

True

False

7

The difference between the true (standard) value and the result of measurement is \*  
(2 Points)

- Accuracy
- Error
- Repeatability
- Reproducibility

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

- True
- False

7

The difference between the true (standard) value and the result of measurement is \*  
(2 Points)

- Accuracy
- Error
- Repeatability
- Reproducibility

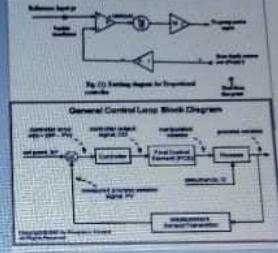
16

The offset introduced by proportional controller with gain  $K_c$  in feedback can be reduced by \* 

(1 Point)

- Reducing value of  $K_c$
- Introducing Integral control
- Introducing derivative control
- None of the above

26



General Control Loop Block Diagram



When comparing the Patching diagram for Proportional controller with General control loop block diagram, the correct match is: \*

(1 Point)

- B with controller,  $K_p$  with final control element
- A with comparator,  $K_p$  with controller
- B with comparator,  $K_p$  with controller
- C with comparator,  $K_p$  with controller

None of the above

9

Arrhenius equation represents graphically the variation between the \_\_\_\_\_ and temperature. \*

(1 Point)

- Rate of reaction
- Frequency factor
- Rate constant
- Activation of energy

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

(1 Point)

True

False

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

(1 Point)

True

False

26

The image contains two diagrams. The top diagram, labeled 'Fig. (1) Patching diagram for Proportional controller', shows a feedback control loop. It starts with a 'Reference Signal' input, followed by a 'Summing junction' (circle with a minus sign). The output of this junction goes to a 'Proportional controller' (triangle) and then to a 'Final Control Element' (circle with a plus sign). The output of the final control element goes to a 'Process' block. A feedback line from the process goes through a 'Measurement Sensor/Transmitter' and a 'Summing junction' (circle with a plus sign) to the reference signal input. The bottom diagram, labeled 'General Control Loop Block Diagram', shows a more detailed block diagram. It includes a 'Controller' block, a 'Final Control Element (FCE)', a 'Process', and a 'Measurement Sensor/Transmitter'. The 'Controller' receives a 'Set point, SP' and a 'Measured process variable, digital, PV'. It outputs a 'Controller output, CO = (SP - PV)' to the 'Final Control Element'. The 'Final Control Element' outputs to the 'Process'. The 'Process' outputs to the 'Measurement Sensor/Transmitter', which then provides feedback to the 'Controller'.

When comparing the Patching diagram for Proportional controller with General control loop block diagram, the correct match is:

(1 Point)

- B with controller, Kp with final control element
- A with comparator, Kp with controller
- B with comparator, Kp with controller
- C with comparator, Kp with controller

Lab 4 Final X Polymer Records - Google Drive X Arhenius equation represents

/forms.office.com/Pages/ResponsePage.aspx?id=u1ABTw3IE6jDj5vz188\_sj314-Ti3dDuwhpo5c7briUOE1NNVdMUIUyRFM

2

The calibration data of a thermocouple are given below. The hot junction of the thermocouple is placed in a bath at 80°C, while its cold junction is at 20°C. What is the (mv) of thermocouple?

(1 Point)

Hot junction temperature (°C)	0	20	40	60	80	100
Thermo emf (mv)	0.00	0.80	1.61	2.43	3.26	4.10

4.06

3.26

2.46

1.61

3

From Arrhenius law, a plot of  $\log K$  versus  $1/T$  gives a straight line with a slope of  $(-E/R)$ . The unit of  $E/R$  is \*

(1 Point)

kcal

kcal/k

21

In level control experiment, the final control element is \*

- Level sensor
- Pump
- Comparator
- Set point

22

18

Inserting any type of conducting wire into thermocouple circuit has no effect on the output as long as both ends of the wire are at the same temperature. \*

- True
- False

19

The most suitable instrument for measuring temperature of steam in the heat exchanger \*

(1 Point)

- Mercury thermometer
- Bimetallic thermometer
- Thermistor
- None of the above

23

The offset increases as the gain of proportional controller increases. \*

(1 Point)

True

False

24

Empirical dynamic models are based on.....data. \*

8

Ethyl acetate reacts with sodium hydroxide in a reaction called saponification reaction, yields products ethyl alcohol and ..... : \*

(1 Point)

A. CH<sub>3</sub>COONa

B. CH<sub>3</sub>COOH

C. CH<sub>3</sub>COOC<sub>2</sub>HS

D. (CH<sub>3</sub>CO)<sub>2</sub>O

9

Which of the following controllers has maximum offset? \*

(1 Point)

P-controller

PI

Activate Windows  
Go to Settings > About

100°F Sunny

Google credit Balqa Applied Univ... Telegram Web Online Python Com... red hat ccna 200-301

18

Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

True

False

19

From Arrhenius law, a plot of  $\log K$  versus  $1/T$  gives a straight line with a slope of  $(-E/R)$ . The unit of  $E/R$  is \*

X

2

To generate empirical models, one of the step test procedure is carried out the process with closed loop\*  
(1 Point)

- True
- False



3

The offset increases as the gain of proportional controller increases.\*  
(1 Point)

Microsoft Edge Microsoft Office Home My tasks message Lab 4 Final lab4 - manual sheet

Office.com/Pages/ResponsePage.aspx?d=ul1ABTw3IE6gDj5vz1B8\_xj314-T13dDuwhpo5c7brfUOE1NNWdMUIUy8JM1RDMxT0RPUjS11dYQj4os8fbcidnhwA82pn55

Maps Translate Google credt Balqa Applied Univ... Telegram Web Online Python Com... red hat ccna 200-301

13



The following setting in Empirical Dynamic Models experiment was for: \*

(1 Point)

- Impulse response
- Step up response
- Step down response
- Step up + step down response

10

The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_

(2 Points)

A

horizontal capillary should be level with the vertex of the funnel

First order reversible reaction

First order series reaction

Reaction order  $n < 1$

Reaction order  $n > 1$

25

The Full Experiment was " \*"

(2 Points)

Level Control

CSTR Reactor

Batch Reactor

Hydraulic Analogue

21

In temperature measurement experiment ,when take the reading of the voltage for the series connection , the voltage value must be divided by ----- to have the temperature reading: \*

(1 Point)

- 40
- 1
- 2
- 4



22

Working principle of mercury in glass thermometer is based on the \_\_\_\_\_ of mercury with increase in temperature \*

(1 Point)

- Increase of pressure
- Increase of thermal conductivity
- Volumetric expansion



21

In temperature measurement experiment ,when take the reading of the voltage for the series connection , the voltage value must be divided by ----- to have the temperature reading: \*

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- 1
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22

Working principle of mercury in glass thermometer is based on the \_\_\_\_\_ of mercury with increase in temperature \*

(1 Point)

- Increase of pressure
- Increase of thermal conductivity
- Volumetric expansion



A+B

None of the above

25

The Full Experiment was " \*  
(2 Points)

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26



29

In temperature measurement experiment , when take the reading of the voltage for the series connection , the voltage value must be divided by \_\_\_\_\_ to have the temperature reading: \*

(1 Point)

40

1

2

4

?



concentration of NaOH and

29 In temperature measurement experiment ,when take the reading of the voltage for the series connection , the voltage value must be divided by \_\_\_\_\_ to have the temperature reading. \*

(1 Point)

- 40
- 1
- 2
- 4

20

Working principle of mercury in glass thermometer is based on the \_\_\_\_\_ of mercury with increase in temperature \*

(1 Point)

- Increase of pressure
- Increase of thermal conductivity
- Volumetric expansion
- All of the above

21

The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_

26 The following experimental setup in Hydraulic Analog experiment was for the \_\_\_\_\_

(2 Points)

A 

- First order reversible reaction.
- First order series reaction.
- Reaction order  $n < 1$ .
- Reaction order  $n > 1$ .

28 Thermistors can have either a negative temperature coefficient (NTC), where the resistance decreases with temperature, or a positive temperature coefficient (PTC) depending on the type of materials used. \*

(1 Point)

- True
- False

29 Higher free energy of activation of a chemical reaction (at a given temperature) implies higher rate of reaction. \*

(1 Point)

- True
- False

21

In level control experiment, the final control element is \*  (2 Points)

- Level sensor
- Pump
- Comparator
- Set point



22