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PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 40

Max Time: 120 Mins

Weightage: 40 %

ENDTERM FINAL EXAMINATION

I Semester AY 2017-18

Course: **PET 202 PROCESS DYNAMIC
CONTROL & INSTRUMENTATION**

19 DECEM 2017

Instructions:

- i. Write legibly
 - ii. Scientific and non-programmable calculators are permitted
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Part A

[2 Q x 4 M= 08 Marks]

Answer any **two** from the following:

1. Define the following:
(a) Characteristic equation (b) Routh stability test (c) Substitution rule (d) Limit cycle
2. A valve with a factor associated with capacity of valve rating 2.0 is used to throttle the flow of kerosene for which specific gravity is 0.8 at 60°C. Determine the maximum flow through the valve for a pressure drop of 80psi.
3. List out the theorems of Routh test for stability

Part B

[3 Q x 6 M= 18 Marks]

4. Describe about Gain and Phase margins with proper bode diagrams and equations with notations
5. Explain briefly about Cascade control with a control diagram & block diagram of a particular system.

(OR)

Explain briefly about Smith predictor with a control diagram & block diagram of a particular system.

6. Explain with proper equation and purpose for the following criteria's :

- (a) Integral of the square of the error (ISE)
- (b) Integral of the absolute value of error (IAE)
- (c) Integral of time-weighted absolute error (ITAE)

Part C

[1 Q x 14 M= 14 Marks]

7. Draw the root locus diagram for the open loop transfer function is

$$G(s) = \frac{K}{s(s+1)(s+3)}$$



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TEST 2

I Semester 2017-2018

Course: **PET 202 PROCESS DYNAMIC
CONTROL & INSTRUMENTATION**

25 OCT 2017

Instructions:

- i. Write legibly
- ii. Draw diagrams with pencil only.

Part A

(1Q x 4M= 04 Marks)

1. Define any **four** from the following:

- (a) Final control element (b) Positive feedback (c) Forward path (d) Offset (e) Set point

Part B

(1Q x 6M= 06 Marks)

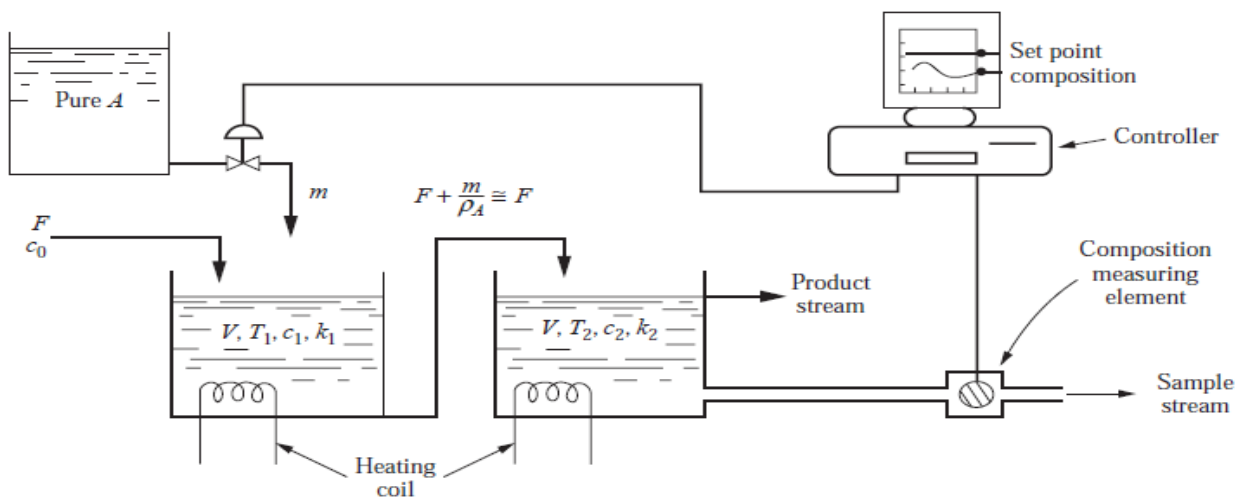
2. Explain any **two** of the following:

- i. Explain in brief about the components of controller with proper block diagram.
- ii. Explain the transient response of proportional control for set point change.
- iii. Explain ON/OFF controller with proper transfer function.

Part C

(1Q x 10M= 10 Marks)

3. Draw a block diagram of chemical reactor control system given below with proper equations and explanations.





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TEST 1

I Semester 2017-2018

Course: **PET 202 PROCESS DYNAMIC
CONTROL & INSTRUMENTATION**

20 SEPT 2017

Instructions:

- i. Write legibly
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-

Part A

(1Q x 4M= 04 Marks)

1. Define the following:

- (a) Block diagram (b) Deviation variable (c) Decay ratio (d) Period of oscillation

Part B

(1Q x 6M= 06 Marks)

2. A thermometer having a time constant of 0.2 min is placed in a temperature bath at 98°F and allowed to come to equilibrium with the bath. At time $t=0$, the temperature of the bath begins to vary sinusoidally about its average temperature of 98°F with an amplitude of 3°F. If the frequency of oscillation is $15/\pi$ cycles/min, Calculate

- (a) Radian frequency (b) Phase Lag (c) Response equation with function of time

Part C

(1Q x 10M= 10 Marks)

3. Derive an overall transfer function of Noninteracting system with the help of neat diagram.